FREQUENCY-BASED CONTINUATION TRAINING (FBCT): A CONCEPT FOR USE IN THE MOBILITY AIR FORCES (MAF)

Graduate Research Paper

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Abstract

The purpose of this GRP was to determine if a Frequency-Based Continuation Training (FBCT) model is more effective, efficient, and flexible than the current flying continuation training (CT) model used by the Mobility Air Forces (MAF).

A Monte Carlo simulation was used to predict the volume of training objectives accomplished and effects of a currency period change on aircrew readiness. Data was sampled from Air Mobility Command (AMC) and Air Force Reserve Command (AFRC) KC-10 pilots to define the distributions used in the Monte Carlo simulation.

The methodology shows that FBCT has an improved effectiveness because it offers a more accurate measurement of Mission Ready (MR) status. The two systems are proven to be equally efficient due to the fact that pilots accomplish the same number of events regardless of the system used. The Monte Carlo simulation could not determine which system provides the greatest flexibility for achieving required mission accomplishment; therefore further research is required to determine which system provides greater flexibility.

The current system of flying continuation training achieves its required objectives but places currency and readiness deadlines at the end of every month, quarter, and semi-annual period. It appears a frequency-based system would also achieve these required objectives while tracking currency and readiness on a longer continuum. The researcher recommends a small group study using AMC and AFRC KC-10 squadrons to determine the second and third order effects of a FBCT program on MAF operations.

Acknowledgements

I would also like to thank my advisor Col Doral “Ned” Sandlin for the many hours he spent directing me and honing my paper, his guidance was crucial to the completion of this research. I sincerely appreciate the assistance from all of my AFIT instructors who guided me over the past twelve months, but I would like to give additional thanks to Dr. Alan Johnson and Dr. Jeffrey Weir. Without their assistance my Monte Carlo simulation and data analysis would not have been so comprehensive.

I would also like to thank the 2d Air Refueling Squadron and the 76th Air Refueling Squadron. The SARM personnel from both squadrons were instrumental in the data collection efforts of this research. A special thanks goes to the HQ AMC/A3T staff, Mr. Michael “Norm” Maloy and Lt Col Dave Brickley, whose assistance provided excellent guidance for this research.

Dedication

I would first like to thank my amazing wife, without whose support I never would have finished this project with my sanity intact. She was my cheerleader over the past year and she made certain that our family was not forgotten during the rigors of the academic year. Thank you; I love you.

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I. Introduction

General Issue

"The [continuation training] CT program provides crew members with the volume, frequency, and mix of training necessary to maintain proficiency in the assigned certification/qualification level" (AF/A3O-AI, 2010). For more than a decade the Mobility Air Forces (MAF) have been training their aircrews to safely and effectively employ their Mission Design Series (MDS) in the current demanding and hostile combat environment. During this time period, multiple overseas contingency operations (OCOs) have caused flying hours to steadily increase and the MAF reduced the flying requirements for Pilots to upgrade to Aircraft Commander (AC) via the Pilot Check Out (PCO) program (AMC/A3TK, 2012). Due to the increased number of hours flown and flying events accomplished, pilots are generally being upgraded at a faster pace than previous decades. The current MAF event-based continuation training (CT) system appears to have adequately met the experiencing and training requirements necessary for aircrew to safely accomplish core tasked missions.

Due to fiscal sequestration and budget uncertainty, there will likely be a sharp decline in future flying hours. During FY13, the U.S. Air Force flying hour budget was reduced by $591 million which required the eliminated of 44,000 flying hours (Everstine & Weisgerber, 2013). If this trend continues then squadron leaders will require greater agility to conduct CT and execute tasked missions.

Problem Statement

The MAF's current CT program is event-based and focuses on the volume of events (aka beans) accomplished during the semi-annual and annual training periods (AF/A3O-AT, 2011). When an aircrew member doesn't accomplish the required number of events for the period, they are coded as Non-Mission Ready (NMR) and must complete the delinquent event(s) under the supervision of an Instructor of like specialty before they are allowed to perform in-flight duties unsupervised (AMC/A3TK, 2012). Additionally, nearly all training events have a currency which has either a monthly, quarterly, or annual accomplishment period. Due to the formulation of currency tracking, events could be accomplished at almost double the assigned currency interval. For example, a pilot with a monthly landing currency could accomplish one landing on the first of July and his currency wouldn't expire until the first of September which is 62 days later. Worse yet, an event with an annual requirement, such as heavyweight receiver Air to Air Refueling (AAR), could have a worst case currency period of 731 days because accomplishment on the first of January would drive a due date of December thirty-first of the following year. Due to the design of the MAF CT system it places an indiscriminate cutoff at the end of every month, quarter, semi-annual, and annual period.

The expected reduction in flying hours will make it more challenging for squadrons to maintain flying proficiency and readiness of their crew force. Without a revised method to manage aircrew flight experience during peacetime, the MAF may risk people and equipment due to a system which does not place enough emphasis on recency of event accomplishment. Squadron level leaders will need an updated flying CT management system which allows them to make the best pilot development and aviation

Operational Risk Management (ORM) decisions. This will drive the demand for effective and efficient allocation of training resources across the continuum of training.

Research Focus

FBCT may be a new name but it is not a new concept for managing and tracking the accomplishment of military flying continuation training. Strategic Air Command (SAC) used a specified day count for tracking currency and volume count when it managed the fleet of KC-135s. Air Combat Command (ACC) continues to use this philosophy for all of their aircraft to include large aircraft with multiple crew positions such as the E-3 AWACS. As the lead command for Combat Air Forces (CAF), ACC establishes sortie-based requirements to meet their targeted accomplishment of events (AF/A3O-AT, 2011). A similar CT system was adopted by Air Force Special Operations Command (AFSOC) in 2012 for their fleet of MC-130s.

As current combat operations continue to wind down, the author assumes that the MAF will find itself in an era of reduced flying hours. If this occurs, the Air Mobility Command (AMC) will be challenged to develop peacetime training efficiencies in order to maintain an acceptable level of operational readiness and combat effectiveness. As planned fiscal constraints pressure the Air Force to cut costs there will likely be fewer exercises and operational missions for MAF aircrews.

This paper will examine the current approach for tracking the Mission Ready (MR) status for the MAF crew force. The author will present methods used by other MAJCOMs to track pilot currency and mission readiness, and information about FAA requirements for commercial airline pilot currency. Additionally, McChord AFB was

given permission to conduct a small group tryout (SGTO) of FBCT from October 2009 to June 2010. The SGTO will be discussed to provide a foundation for an alternative to the current CT program used by the MAF.

Research Question

As military leaders we rarely think of ourselves as managing a business so we fail to ask important questions such as, "Who is our customer? What does our customer want from us?" Examining the MAF from more of a business perspective allowed the following question to frame the research for this paper: *How can AMC develop a continuation training table that best supports its combatant command (COCOM) customers with the least amount of cost to the enterprise*?

"The Joint Mission Essential Task List, the Air Force task lists, and MDS-specific volumes of the AFI 11-2 series are the foundational requirements that link aircrew training to tasks required to support Combatant Commanders" (AF/A3O-AT, 2011, p. 2). The MAF provides a service to its COCOM customers and therefore aircrew training should focus on which training events add value to the service being provided to these customers. This paper will examine the FBCT system to determine if it would provide an improved method to maximize training effectiveness, efficiency, and flexibility.

Methodology

The author sampled current KC-10 pilot event accomplishment data from one AMC squadron and one AFRC squadron to develop a cross-sectional study (Leedy & Ormrod, 2010, p. 186). The data collected was from the accomplishment time period of June 2013 to February 2014. The samples were categorized by crew positions and event

type in order to segregate the attributes of event accomplishment and analyze their distribution characteristics. After the distribution equation was established for the data, the author developed a Monte Carlo simulation to use for further analysis. A Monte Carlo simulation was chosen because it uses random variables to predict the possible outcomes for a defined distribution.

The developed model allowed the researcher to predict the impact of training period changes upon the completion percentage for a given event. These changes were then used to compare the completion percentages of the current CT system to that of the FBCT system. The simulation was also able to predict the number of events which would be accomplished over a semi-annual and annual period for the given distribution. The simulation outcomes were compared to determine the probable effectiveness, efficiency, and flexibility of each CT system.

Assumptions/Limitations

The data collected represents a random sampling of AMC and AFRC KC-10 pilots, but this does not ensure that the data collected is representative of the entire population. The author assumes the sampled data presents an accurate community-wide picture of event accomplishment categorized by MAJCOM (AMC and AFRC) and sub-categorized by crew position.

The data collected represents the level of event accomplishment of the crew force during the current ops-tempo and deployments in support of combat operations. Due to this fact, it is difficult to predict what the distribution for event completion would be in a peacetime scenario. Fortunately due to the relatively lower ops-tempo and fewer pilot

deployments, the data collected on AFRC pilots was used to assess the expected distribution of event completion in a peacetime situation. For the purpose of this paper, the author uses AMC data to represent the event completion expected during current combat operations and AFRC data to represent expected peacetime event completion.

Implications of Process Reengineering

Process reengineering (Hammer & Champy, 1993) is the key to the AFSO21 program but too often the process is only redesigned at the wing level or lower. In order to reduce costs and close in on some of the savings required by sequestration, a larger enterprise view of the training process must be examined. The proponents of process reengineering will often state that, "reengineering is the *fundamental* rethinking and *radical* redesign of business *processes* to achieve *dramatic* improvements in critical, contemporary measures of performance, such as cost, quality, service, and speed" (Hammer & Champy, 1993, p. 50). Dr. Michael Hammer focuses on seven principles for redesigning a process which he describes as: "*what* tasks are performed; *whether* they should be performed and under what circumstances; *who* performs them; *when* they are performed; *where* they are performed; *how precisely* they are performed; and *what information* they employ" (Hammer & Hershman, 2010).

Aircrew training is an excellent process to reengineer because it will have an immediate effect on operational capability and resource conservation. By examining each of these seven principles as they relate to flying CT, then a better system can be reengineered which achieves a higher performance than the current system. Below is a

discussion of these seven questions as they relate to a KC-10 pilot's flying continuation training program.

- What tasks are performed? KC-10 pilots are currently required to track 61 flying currency events per year.
- Should all of these tasks be performed and under what circumstances? This is an essential question that must be answered by a collection of subject matter experts (SMEs) before the process can be reengineered. In this paper the author takes the position that some tasks are not required because they do not add value to the customer.
- Who performs the events? Again, this is a question for SMEs who understand the challenges of the current system. It is quite possible that IPs should not be required to track as many events as MPs or vice-versa. This discussion could also lead to a review of upgrade training requirements for FPs which would further modify the CT requirements for that crew position.
- When are the events performed? This question is the crux of this paper and hopefully it will provide some assistance in the reengineering of the CT program.
- Where are the events performed? Recently, more training events have migrated into the simulator from the aircraft because they are procedural training events which can benefit from the controlled complexities that a simulator provides: i.e. max crosswind landings; instrument approaches to minimums; aircraft malfunctions.

- How precisely often are the events performed? SMEs would need to address how often the events are performed as they conduct an in-depth review of the training profiles.
- What information do the events employ? Dr. Hammer states that the answer to this question "…is the most fundamental aspect of process design. It poses the central question underlying all work: what do we need to do to deliver what the customer wants? Answering that question reveals what activities should be included in process design in the first place" (Hammer & Hershman, 2010). The SME answer may be that some events are not required to be tracked and/or more events are required to be tracked.

Considerations

There is a psychological concept which considers the mental process of recency effect which states that individuals tend to be most influenced by what they have last seen or heard. This is because people tend to retain the most complete knowledge about the most recent events. (Marshall, 1998) "Avemco data shows that a pilot who's out of currency by 90 days has the potential to be just as dangerous as a pilot climbing into an aircraft that he or she has never flown" (Lee, 2013). Additionally, the concept of the "primacy effect refers to the process by which early information colors our perception of subsequent information. The commonsense notion that first impressions are the most compelling is not always correct. First impressions may count most because subsequent information is more difficult to absorb—although recent information may be remembered

most clearly" (Marshall, 1998). This paper asserts that the psychological effects of recency and primacy should be fully considered when developing flying continuation training profiles for aviators.

II. Literature Review

Chapter Overview

Aircrew training is much more than ensuring all aircrew members accomplish their assigned training. The greatest challenge of executing any training program is managing the people, events, and timing. This concept is very similar to the concepts required for supply chain management (SCM). SCM is defined as "the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders" (Lambert, 2008). These concepts will be developed further as they are directly applicable to reengineering the CT process and management of the flying hour program.

It is important for this paper to describe some of the methods that various organizations use to track pilot flying continuation training. This discussion will begin with the current AMC method because it is the baseline from which a comparison will be made to the other methods. The author will examine the historical guidance used by Strategic Air Command (SAC) followed by a review of crew aircraft that are operated by Air Combat Command (ACC) and Air Force Special Operations Command (AFSOC) in order to understand the current methods utilized by them. The paper will also provide a brief discussion of the United States Federal Aviation Administration (FAA) requirements for private, commercial, and transport pilots to maintain their currency. Finally there will be an examination of the AMC sponsored small group tryout (SGTO) of FBCT that was accomplished at McChord AFB from 2009-2010.

Flying Hour Program

"The Air Force Flying Hour Program is a requirements-based, peacetime program consisting of the flying hours necessary to train aircrews to safely operate aircraft while sustaining them in numbers sufficient to execute the core tasked mission… The centrality of the flying hour program to readiness and combat capability cannot be overemphasized. It must be defendable and auditable. To that end, it must be standard across the Total Air Force, connected to readiness indicators, based on the train-to-task concept, easily understood, and most importantly, based upon the requirements to train and experience aircrew to perform required Air Force missions" (AF/A3O-AT, 2011).

It is important to understand that the CT program is a significant input to the flying hour program. The Air Force Single Flying Hour Model (AFSFHM) is composed of five components: Force Structure; Aircrew Data; Requirements; Calculation; and Summary as shown in Figure 1 (AF/A3O-AT, 2011). The last component is also the summary of annual flying hours required to maintain the peacetime combat readiness for each MDS.

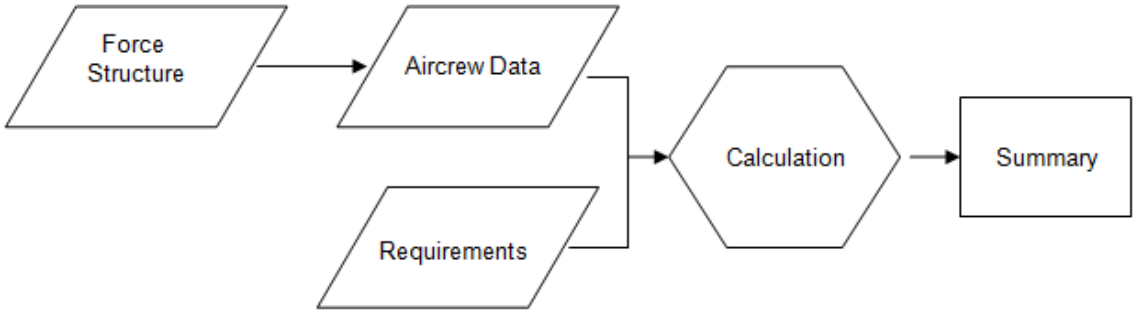

Figure 1: The Air Force Single Flying Hour Model (AF/A3O-AT, 2011, p. 4)

The requirements component includes "those events associated with Undergraduate Pilot Training (UPT), initial and mission qualification training,

continuation training, upgrade, requalification, and special capability training events/sorties that aircrew must accomplish during the training cycle" (AF/A3O-AT, 2011). Continuation training is a sizeable entry into the requirements of the AFSFHM, and any changes made to the CT program could seriously affect the calculation of flying hours.

The flying hour program is a critically important part of the USAF budget because it expresses combat readiness. According to Air Force Policy Directive (AFPD) 11-1, "The Air Force flying hour program is a closely monitored program that equates flying hours to combat capability. To meet these expectations, the Air Force must explicitly program flying hours that fully support required capability and then execute the resources associated with flying hours" (HQ USAF/XOOTF, 2004). AFPD 11-1 also directs the Air Force to:

- Plan the flying hour program based on peacetime, home station training requirements
- Execute its approved flying hour program to the maximum extent possible
- Allocate resources to support its approved flying hour program

For each MDS, the Secretary of the Air Force designates one command to be the lead. AFPD 10-9 (Lead Command Designation and Responsibilities for Weapon Systems) designates AMC as the lead command for MAF assets and AFPD 10-21 (Air Mobility Lead Command Roles and Responsibilities) defines AMC's responsibilities. "The lead command establishes the training requirements basis for all mission design series (MDS) aircraft in its inventory. User commands must use the same flying hour

computations. Lead commands will inform user commands of any training/calculation changes" (AF/A3O-AT, 2011).

Continuation Training Provides a Service

Continuation training is a very complicated business because it is essentially a service provided to ensure that crewmembers are properly prepared to execute the mission. A service is "an activity or series of activities of more or less tangible nature that normally, but not necessarily, take place in interactions between customer and service employees and/or physical resources or goods and/or systems of the service provider, which are provided as solutions to customer problems. A service is a time-perishable, intangible experience performed for a customer" (Fitzsimmons & Fitzsimmons, 2011, p. 4). Therefore the four key characteristics of a service must be taken into account when analyzing the process. Those four key characteristics are: perishability; intangibility; inseparability; and variability.

Perishability or the inability to produce the service and stockpile it for later consumption is the greatest challenge of continuation training. A training event, like so many other aspects of continuation training, exists only at the time and place of production and it is lost forever if not used (Fitzsimmons & Fitzsimmons, 2011, p. 20).

Intangibility or the inability to assess the value gained from engaging in an activity using tangible evidence. The intangibility of training is addressed through the use of instructor feedback and aircrew performance evaluations. Much like a customer survey, the use of written instructor and evaluator feedback are an attempt to assess and improve the value gained during the activity.

Inseparability or the inability to separate the product from the service is even more acute when accomplishing training. Flying events are tracked for a MAF aircrew because the event knowledge is necessary to provide the requisite product to the COCOM customer. Therefore a portion of all flying continuation training events are also accomplished while fulfilling a real-world COCOM requirement. This presents an opportunity for aircrew to receive additional training while supporting the customer.

Variability or the variation of a training event due to the person, place, time, or method in which the event is presented can have a dramatic effect on the type of training received. Approach and landing on a clear day is not the same as it is in the clouds with 200 foot ceilings and one-half mile visibility. Receiver AAR behind a KC-135 being flown by unqualified pilot is not the same as receiver AAR behind a KC-10 being flown by an evaluator pilot. It is the variability of the service which becomes a tool that trains the student.

These four key characteristics complicate the systematic scheduling and provide challenges to sustain effective continuation training periods. For continuation training to be the most economical it requires the right person accomplishing the right event at the right time. It is the mismanagement of perishable training resources which leads to cost overruns especially when the resource is rigidly controlled, therefore flexibility and cost savings are intertwined.

AMC Continuation Training

AMC's current flying continuation training program is volume-based and focuses on the number of events (aka beans) accomplished during the semi-annual or annual training periods. When an aircrew member does not accomplish the required number of events for the training period they are declared "[non-mission ready] NMR in those unit missions requiring the event(s)" and must complete the delinquent events under the supervision of an instructor of like specialty before they can deploy or perform in-flight duties unsupervised (AMC/A3TK, 2012, p. 48).

Additionally, one-third of the training events have a required monthly, quarterly or annual frequency (aka currency) associated with them. A crewmember that is non-current for an event is also considered NMR and must regain currency in the event before they may perform "unsupervised in-flight duties in the non-current event(s)" (AMC/A3TK, 2012, p. 47). Due to the formulation of currency tracking, events could be accomplished at almost double the assigned currency interval. For example, a pilot with a monthly landing currency could accomplish one landing on the first of July and his currency wouldn't expire until the first of September which is 62 days later. Worse yet, an event with an annual requirement, such as heavyweight receiver AAR, could have a worst case currency period of 731 days because accomplishment on the first of January would drive a due date of December thirty first of the following year.

The design of the MAF CT system it places an indiscriminate cutoff at the end of every month, quarter, semi-annual, and annual period. An excerpt from AFI 11-2KC-10 Vol 1 is found in Table 1 and has been included as a visual representation of AMC's

current Semi Annual Continuation Training Flying Requirements. The complete table of KC-10 pilot flying continuation training requirements can be found in APPENDIX A.

Table 1: KC-10 Pilot Semi Annual Continuation Training Flying Requirements (AMC/A3TK, 2012)

		Aircraft Commander (FPL+)					Pilot (FPQ)				Creditable in WST			
Code	Event	A	B	C	E	C U R	A	B	C	C U R	%	Maintain	Regain	Notes
N010	Tanker RV	4	5	6		Q	4	5	6	Q	100%	Y	Y	
N020	Tanker/Receiver RV Golf (En-route)	1	1	2			1	1	2		100%	Y	Y	
N030	Tanker RV Delta (Point Parallel)	1	1	2			1	1	2		100%	Y	Y	
N040	Tanker RV Alpha (Anchor)	1	1	1			1	1	1		100%	Y	Y	
P004	MPD Taxi						2	4	4					
P005	Taxi Exercise	1	2	2			2	2	2					16
P010	Takeoff, Initial	2	4	6	2	Q	2	4	6	Q	100%	Y	Y	15
P020	Takeoff	8	10	12	6	M	8	10	12	M	100%	Y	Y	5,15
P028	Right Seat Takeoff										100%			7,15
P029	Left Seat Takeoff						2	3	3	Q	100%	Y	Y	15

SAC Continuation Training

Strategic Air Command (SAC), which existed from 1946 to 1992, was responsible for two-thirds of the nation's nuclear triad. This mission required SAC to manage various types of aircraft and crew which all had to achieve the highest degree of peacetime readiness because they could be called upon at a moment's notice. With 46 years of experience and the daunting task of this incredible no-fail mission, it is important for us to examine the training requirements which were placed on these intrepid crews. With great thanks to the USAF Historical Society at Maxwell AFB, a copy of SAC Regulation (SACR) 51-135 Volume IV, KC-135 Aircrew Training – Continuation Training (Phase III), was obtained for inclusion into this paper (SAC/DOST, 1983). The

original SACR 51-135 was difficult to read so the author generated a replica and added it as Table 2 of this paper. The original table from SACR 51-135 Volume IV dated 13 June 1983 can be found in APPENDIX B of this paper.

Table 2: SACR 51-135 Mission-Ready Training Requirements (SAC/DOST, 1983)

CHAPTER 6
MISSION-READY FLYING TRAINING REQUIREMENTS
6-1. MISSION-READY REQUIREMENTS (KC-135A/Q/D):
a. Pilot:

CODE	EVENT	NO.	ARF ONLY NO.	FREQ NO DAYS
I09	Nonprecision Approach	3	6	
I10	Missed Approach	2	4	
I14	Instrument Approach			1/45
I23	Precision Approach	3	6	
M14	Alert Start, Cartridge	1	2	
P02	Sortie (ARF only)		18	
P02	Sortie (N/A ARF) Select Senior Ready	 8 9 10		
P08	Takeoff	2	4	1/45
P13	Landing (Non-fan)			1/45
P82	Landing (Fan)(KC-135E)			1/45
P83	Landing	4	8	
P16	Landing (Night)			1/180

It is important to note that for some training requirements SAC choose to provide only a frequency for accomplishment, such as Landing (Night). For other training events SAC only required the volume of accomplishment to be tracked, such as Landing. There are also training events that SAC required both frequency and volume to be tracked, such as Takeoff. In 1992 SAC aircraft and personnel were divided into CAF and MAF mission sets and transferred to ACC, AMC, Pacific Air Forces (PACAF) and U.S. Air Forces Europe (USAFE) (“Strategic Air Command”, n.d.). The author assumed that the

SAC philosophy for accomplishing and tracking flying continuation training traveled with the personnel to their new commands.

ACC Continuation Training

Air Combat Command (ACC) was activated in 1992 and it manages the flying continuation training of crew aircraft and single-seat aircraft in a manner very similar to SAC. The peacetime readiness requirement for ACC is very similar to SAC and therefore the flying training requirements will seem familiar to what was shown in the previous section. Table 3 is an excerpt from AFI 11-2E-3 Vol 1, and it has been included as an example of ACC's Flying Currency Requirements. This table can also be found in APPENDIX C.

Table 3: E-3 Pilot Currency Requirements (ACC/A3CA, 2012)

TRAINING EVENT	NOTES	CURRENCY
Take Off	1, 6	1/45 days
Instrument Approach	6	1/45 days
Landing	6	1/45 days
Night Landing	3, 6	1/120 days
Touch and Go Landing	5, 6	1/45 days
Air Refueling	2, 6	1/45 days
Night Air Refueling	2, 3, 6	1/120 days
Autopilot-Off Air Refueling	2, 6	1/180 days
Sortie	4, 6	1/60 days

1. Log a takeoff when controlling the aircraft on any takeoff to include Touch and GOs.
2. Log Air Refueling with Night Air Refueling and/or Autopilot Off Air Refueling when applicable.
3. Not applicable to 962 AACS.
4. Lookback for CMR aircrew. See paragraph **4.7.2** and **Table 4.5.**
5. IPs only.
6. Expiration of currency does not require CMR/BMC regression.

Obviously this table is not inclusive of all the flying continuation training events that are required of E-3 pilots because ACC flying training requirements are sortie-based. The sortie-based requirements are tracked by ACC under its Ready Aircrew Program (RAP). ACC states the goal of continuation training as: "CT provides aircrew with the volume, frequency, and mix of training necessary to maintain proficiency in the assigned qualification level. RAP is the CT program designed to focus training toward needed skills" (ACC/A3CA, 2012).

ACC further describes the purpose for training missions as the following:

> "Training missions will be designed to achieve combat capability in squadron tasked roles, maintain proficiency, and enhance mission accomplishment and safety. RAP training missions should emphasize either basic combat skills, or scenarios that reflect procedures and operations based on employment plans, location, current intelligence, and opposition capabilities. Use procedures and actions applicable to combat scenarios (i.e. appropriate use of code words, authentication procedures, combat tactics, safe recovery procedures, tactical deception, in-flight reports, threat reactions, intel briefing and debriefing)."
>
> (ACC/A3CA, 2012)

The E-3 pilot flying CT requirements are included in the RAP Tasking Memorandum (RTM) which is updated with each new 12-month training cycle, or as required (HQ ACC/A3C, 2014). The RTM lists the events and states the required volume, frequency, and mix of training necessary to maintain proficiency in the assigned qualification levels (ACC/A3CA, 2012, p. 9). An excerpt of the E-3 RTM can be found below in Table 4. The entire table for E-3 pilots RAP event requirements from the E-3 AWACS RTM can be found in APPENDIX D.

Table 4: E-3 Pilot Flight Event Requirements (HQ ACC/A3C, 2014)

TRAINING EVENT	TASK ID	CURRENCY	CMR/I Aircrew	CMR/E Aircrew	BMC Aircrew	Notes
Sortie	SX00	1/60 days	24	12	6	
Lookback	SR00					
Takeoff	TO01	1/45 days	9	6	3	1
Retrograde Procedures	RA31	1/180 days	3	2	2	9, 10
Instrument Approach	AP31	1/45 days				3
Precision Approach	AP01		9	6	3	3, 4
Non-Precision Approach	AP02		5	3	2	3, 4
Circling Approach	AP21		3	2	1	4
Landing	LD01	1/45 days	9	6	3	8
Night Landing	LD02	1/120 days	3	2	1	6, 8
3-Engine Landing	LD29		3	2	1	8
3-Engine/Missed Approach	AP23		3	2	1	
Touch and Go Landing	LD03	1/45 days				5
Air Refueling	AR01	1/45 days	5	3		2, 7
Night Air Refueling	AR02	1/120 days	3	2		2, 6, 7
Autopilot-Off Air Refueling	AR04	1/180 days	2	1		2, 7
Pilot Proficiency Event	SR70		5	3	2	5

AFSOC Continuation Training

AFSOC adopted the RAP concept with the latest change to their publications in 2012. AFI 11-2MC-130 Vol 1, dated 17 December 2012, contains the following in the Summary of Changes: "This publication has been substantially revised and must be completely reviewed. Major changes to this instruction include: removal of continuation training tables and event definitions which are now distributed in Ready Aircrew Program (RAP) Tasking Memoranda (RTMs) format; …" (AFSOC/A3T, 2012). An example of the MC-130 flying currency requirements in days by Flying Training Level (FTL) can be found below in Table 5 and the entire requirement table is located in APPENDIX E.

Table 5: MC-130 Flying Currency Requirements (AFSOC/A3T, 2012)

See MDS-specific RTM for more detailed currency and volume flying requirements by FTL.												
EVENT	**ARMS ID**	**P/CP**		**Nav**		**EWO**		**FE/ AMSS**		**LM**		**Notes**
		A/B	**C**	**A/B**	**C**	**A/B**	**C**	**A/B**	**C**	**A/**	**C**	
BAQ												
Aircrew Proficiency Sortie	ST14	**60**	**45**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**60**	**1,2**
Total Takeoffs	TO00	**60**	**45**									**1,2**
Instrument Approaches	AP10	**60**	**45**									**1,2**
Total Landings	LD00	**60**	**45**									**1,2**
Left Seat Landing (FP)	LD60	**45**	**45**									**5**

Even though AFSOC adopted the RAP concept for currency and volume requirements, they made some notable modifications to the concept. AFSOC selected three classifications and then divided events into one of the three classifications. The classifications are: Basic Aircraft Qualification (BAQ); Mission; and Special Mission. An example of semi-annual MC-130J RTM BAQ events can be found in Table 6 and all of the MC-130J RTM events can be found in APPENDIX F.

Table 6: Semiannual MC-130J Flying Requirements (HQ AFSOC/A3T, 2014)

EVENT Volume by FTL	ARMS ID	DUAL LOGS	Pilot/CP			CSO			Currency		Notes
			A	B	C	A	B	C	A/B	C	
Simulator Sortie	ST03		6	6	6	6	6	6			5
Aircrew Proficiency Sortie (APS)	ST14		6/5	9/6	12/6				60d	45d	1,2,3
APS	ST14					6/3	9/6	12/6	60d	45d	1,2, 3
Local Proficiency Sortie	ST15		1/0	2/1	2/1						3
EPE	ST94		1	2	3						3
EPE	ST94					1	2	3			3
PILOT PRO EVENTS											
Total Takeoffs	TO00		8/4	12/6	16/8				60d	45d	1,2,3
- Night Takeoffs	TO05	TO00	2	3/2	4/2						3
- Left Seat Max Effort T/O (FP)	TO23	TO00	0	0	6/4						3
Instrument Approaches	AP10		8	12/8	16/8				60d	45d	1,2,3
- Precision Approaches	AP20	AP10	4	6	8/4						3
- Non-Precision Approaches	AP21	AP10	4	6	8/4						3
Circling Maneuver	AP30		1	1	2/1						3
Category II ILS Approaches	AP18	AP10 AP20	1	1	2/1						3,4
Holding Pattern	AP35		1	1	2/1						3
Missed Approach	AP40		1	1	2/1						3

Failure to accomplish BAQ currency or volume requirements results in the loss of basic aircraft currency. AFSOC authorizes C-130 crewmembers to maintain BAQ qualification in the "slick" C-130 variant (C-130 E/H) while maintaining mission qualification in a specialized C-130 (i.e., AC-130, MC-130) (AFSOC/A3T, 2012). AFSOC determined that an evaluation is required for a Special Mission Qualification, but aircrew members are not required to maintain currency in Special Mission Events to maintain MR status (AFSOC/A3T, 2012, p. 25).

FAA Continuation Training

According to Federal Aviation Regulation (FAR) 61.57, pilots are required to complete three takeoffs and three landings in the last 90 days and six instrument

approaches in the last six months prior to the present flight in order to maintain their currency. These required takeoffs, landings, and instrument tasks may be accomplished in a flight simulator which meets all of the FAA requirements listed in the FARs. In order to regain their currency a pilot must complete all of the delinquent tasks before performing duties as a pilot in command (individual who is the sole manipulator of the flight controls). The following is an excerpt from the FAR:

> (a) *General experience.* (1) Except as provided in paragraph (e) of this section, no person may act as a pilot in command of an aircraft carrying passengers or of an aircraft certificated for more than one pilot flight crewmember unless that person has made at least three takeoffs and three landings within the preceding 90 days, …
>
> (b) *Night takeoff and landing experience.* (1) Except as provided in paragraph (e) of this section, no person may act as pilot in command of an aircraft carrying passengers during the period beginning 1 hour after sunset and ending 1 hour before sunrise, unless within the preceding 90 days that person has made at least three takeoffs and three landings to a full stop during the period beginning 1 hour after sunset and ending 1 hour before sunrise, …
>
> (c) *Instrument experience.* Except as provided in paragraph (e) of this section, a person may act as pilot in command under IFR or weather conditions less than the minimums prescribed for VFR only if:
>
> (1) *Use of an airplane, powered-lift, helicopter, or airship for maintaining instrument experience.* Within the 6 calendar months preceding the month of the flight, that person performed and logged at least the following tasks and iterations in an airplane, powered-lift, helicopter, or airship, as appropriate, for the instrument rating privileges to be maintained in actual weather conditions, or under simulated conditions using a view-limiting device that involves having performed the following—
>
> (i) Six instrument approaches.
>
> (ii) Holding procedures and tasks.
>
> (iii) Intercepting and tracking courses through the use of navigational electronic systems.
>
> (14 CFR Part 61, 2013)

McChord SGTO

A small group tryout (SGTO) of the FBCT concept was conducted at McChord AFB from October 2009 until June 2010. McChord AFB was authorized by AMC/A3 to

conduct a C-17 Training Initiative SGTO with a goal to refocus, revalidate, and simplify continuation training (AMC/A3, 2010). The original intent of the initiative was to "thoroughly analyze C-17 continuation training from end to end - determining what training could be moved to the simulator, what must remain in the aircraft, and what could be eliminated. The group also looked at how to maximize efficiency, leverage experience, and reduce training complexity" (AMC/A3, 2010).

Aligned with the goal of simplifying CT, the initiative developed a method to streamline currency tracking. The currency system developed for tracking flying events became frequency-based (i.e. number of days since last accomplished), but ground training events were still tracked according to AMC source regulations (AMC/A3, 2010). As an example, consider a flying training level "A" pilot accomplishes a takeoff on 31 January. Under the FBCT system, he/she would remain current for 60 days after that event (see Table 7) and the pilot would expire on 1 April. Under the current AMC system, he/she would remain current for 28 days and the pilot would expire on 28 February due to the monthly currency of the event. Under the FBCT system, if the pilot re-accomplished a takeoff on 15 February, his/her currency would be extended to 16 April versus 31 March for the AMC system (AMC/A3, 2010). The entire table for the SGTO Pilot Flying Currency Cycles is located in APPENDIX G.

Table 7: SGTO Pilot Flying Training Currency Cycles (AMC/A3, 2010)

Airland Events		Flying Training Level				
Code	**Event**	**C**	**B**	**A**	**Notes**	**SIM**
P020	Takeoff	60	60	60	1, 2	M+R
P070	Instrument Approach	60	60	60	1, 2	M+R
P190	Landing	60	60	60	1, 2	M+R
P192	Night Landing	90	90	90	1, 2	M+R
NV47	NVG Takeoff	90	120	150	1, 2, 9	M+R
NV48	NVG Landing	90	120	150	1, 2, 9	M+R
R010	AR		45	60	2, 3, 7, 9,	See
R020	Night AR		120	180	2, 3, 4, 9,	See
R050	Auto Pilot Off AR		180	180	2, 13	N
M030	Overseas Sortie	365	365	365	11	N
M040	PNAF SORTIE	180	180	180	10	N
AS11	ALZ		90	120	2, 9, 13	M
NV49	ALZ (NVG)		90	120	2, 9, 13	M
P260	Have Quick	365	365	365		M+R
P270	Secure Radio Operation	365	365	365		M+R

The initiative also addressed the volume requirement that is associated with the majority of flying events as noted in each of the previously discussed USAF flying CT programs. The following is an excerpt from the AMC/A3 C-17 Training Initiative Small Group Tryout (SGTO) (62/446 AW - McChord AFB) CONOPS:

> 3.2.1. This concept also eliminates the restriction of semi-annual volume requirements in relation to Non-Mission-Ready (NMR) status at the end of the semi-annual period. Under the current Vol 1 construct, a member who fails to achieve a certain event volume (i.e. four tactical arrivals) becomes NMR at the end of a semi-annual period even if otherwise current (i.e. had accomplished a tactical arrival within the appropriate cycle). Additionally, Aviation Resource Management System (ARMS) does not have the ability to keep track of "volume deficiencies" from one semi-annual period to the next. This places a significant administrative burden on each unit at the end of every semi-annual period to track members who are volume deficient using a separate mechanism. This initiative replaces the semi-annual construct with a continual "currency only" cycle.
>
> (AMC/A3, 2010)

The FBCT concept developed by the C-17 training initiative also addressed the NMR status of CT associated with the tracking of frequency but not volume of flying

events. The initiative simply continued with the current AMC policy of declaring non-current crewmembers NMR in "those unit missions requiring that event" (AMC/A3TK, 2012). Additionally, it was directed that NMR crewmembers "will fly in a supervised status (with an Instructor of like specialty) until MR status is regained….Crew-members are non-current the day after event currency expires" (AMC/A3, 2010). A caveat was given for NMR crewmembers to fly unsupervised on "CONUS and OCONUS missions on which events in the delinquent category are not accomplished ([Operation Group Commander] OG/CC approval not required for local, routine, and non-contingency missions, but a waiver back to MR status is required for a stage or contingency mission)" (AMC/A3, 2010). The OG/CC was specified as the waiver authority for up to one entire currency cycle.

The SMEs who developed the training initiative went even further in their goal to refocus, revalidate, and simplify CT by reducing the number of tracked flying events. The SMEs examined the 61 C-17 pilot CT events required by AFI 11-2C-17 Vol 1which consist of: 36 Airland events; 10 Airdrop events; 7 Formation events; 5 NVG events; and 3 Air Refueling events (AMC/A3TA, 2012). The SMEs determined that training could be refocused and simplified by deleting events and combining related events into a single event identifier. This SGTO was able to reduce the number of events tracked to 42 C-17 pilot CT events: 15 Airland events; 8 Formation events; 6 Airdrop events; and 13 Airland events normally accomplished in the simulator (AMC/A3, 2010). The entire tables for the SGTO Pilot Flying Currency Cycles and Normal Simulator Events (creditable in aircraft) are located in APPENDIX G.

The SGTO was cancelled in June 2010 and was seen by some as a success and by others as a failure. The FBCT program accomplished fewer training sorties and lowered the semi-annual NMR rate but increased the daily NMR rate. The 62 OSS/DO stated in a response to the AMC/A3 that, "We looked back at a 3-month period (Oct – Dec) for both years. In 2008, we had 380 locals on the books. In 2009, we had 326 locals – a 15% decrease" (Olekszyk, 2010). A lower semi-annual NMR percentage was generated in exchange for a higher daily NMR rate. In the same response, the 62 OSS/DO identified that, "On 31 Dec 2008, we had 122 NMR crewmembers. On 31 Dec 2009, we had 92 NMR crewmembers under SGTO – a 25% decrease" (Olekszyk, 2010). The 62 OSS/DO explained in a bullet background paper for AMC/A3T that,

> "The shift from semi-annual-based to rolling currency, by definition, will drive higher daily NMR rates. We strongly believe, however, that the additional management "cost" these higher NMR rates incur is more than offset by the "savings" in managing end-of-semi-annual spikes in NMR rates. The rolling currency construct forces crewmembers to be more aware and proactive with their training requirements. Finally, our crew generation during the Haitian earthquake relief effort and the current OCO surge shows that the current NMR rates are manageable."
>
> (Olekszyk, 2010)

Unfortunately the data from the 62nd and 446th Airlift Wings at McChord AFB was not available for the author to analyze. Therefore the author assumes the data presented by the SGTO is accurate and supports their claims that FBCT was an improved method for tracking and accomplishing flying CT.

III. Methodology

"Essentially, all models are wrong, some are useful" – George Edward Pelham Box

Chapter Overview

The MAF and more specifically the KC-10 pilot community currently does not use a frequency-based CT system except for one event, Receiver AAR. The author developed a model to estimate currency percentage and volume of accomplishment for a KC-10 FBCT system. The author chose to employ a Monte Carlo simulation in order to provide a randomly generated set of data for further analysis. In order to use this methodology the author required samples from current KC-10 pilot ARMS data. The sampled data was used to develop the mathematical distributions and mean for each event in order to model the rate of event accomplishment via the Monte Carlo simulation. The output from the model was then used to compare the expected effectiveness of the current KC-10 CT system and a proposed KC-10 FBCT system.

Monte Carlo Simulation

Monte Carlo simulations "are a broad class of computational algorithms that rely on repeated random sampling to obtain numerical results; typically one runs simulations many times over in order to obtain the distribution of an unknown probabilistic entity" ("Monte Carlo method", n.d.). The Monte Carlo simulation allows the user to generate a much larger data set using a defined distribution from a smaller data set. The model's output is generated by the use of defined distribution parameters and a random number generator. A Monte Carlo simulation was chosen for this research because it allowed the researcher to more accurately model predicted outcomes when given a relatively small

sample of data. The selected training events, sampled data, and defined distribution used in this research will be discussed later in this section.

Selected Training Events

The author chose to focus on two different types of events. The first type of sampled training events is basic aircraft qualification (BAQ). These events were chosen because they are required for all pilot crew positions to maintain a BAQ or Flying Training Level (FTL) E status. The 11-2KC-10 Volume 1 describes FTL E as: "BAQ or BMC non-instructor staff. FTL E requirements are insufficient for MR status and crewmembers assigned to this FTL will fly with an instructor of like specialty at all times" (AMC/A3TK, 2012). These are events which can be accomplished during either an aircraft or a simulator sortie: Takeoff; Instrument Approach; Landing; and Landing, Night.

The second type of sampled events are those which are required for all mission-ready pilots and in the author's view they are also the most commonly required mission events for the KC-10. These mission events can be accomplished during either an aircraft or simulator sortie: Formation; Receiver AAR; and Tanker AAR. Currency can be maintained for these mission events when accomplished in the simulator, but for each semi-annual period only one Formation event may be credited. Additionally, currency may not be regained in the simulator for Formation or Receiver AAR.

Sampled Data

Due to the limitations of the ARMS database, the author manually located and recorded the event accomplishment dates from the archived Mission Accomplishment

Report Sheets (MARS) of 24 Air Mobility Command (AMC) and 23 Air Force Reserve Command (AFRC) pilots. The breakdown of the AMC pilots is: eight Instructor Pilots (IPs); ten Mission Pilots (MPs); and six First Pilots (FPs). The breakdown of the AFRC pilots is: twelve IPs; five MPs; and six FPs.

Defined Distribution

After collecting the event data from the sampled AMC and AFRC pilots, the author used analysis software to fit the data to a mathematical distribution function for later use in the Monte Carlo simulation. The author initially built histograms in Microsoft Excel for each event to determine the general shape of the distribution. The distribution was further refined through the use of Reliability Analysis software from Charles E. Ebeling's textbook, *An Introduction to Reliability and Maintainability Engineering* (Ebeling, 2010). The frequency for the majority of these events followed an exponential distribution as can be seen in Figure 2.

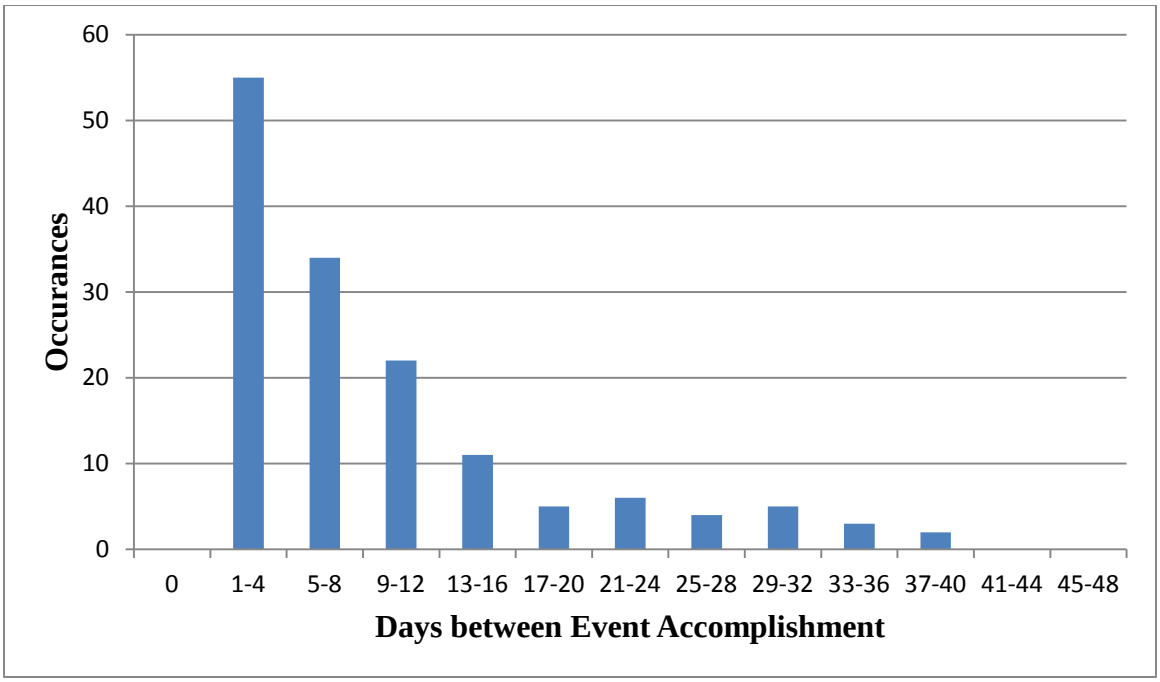

Figure 2: Histogram of AMC KC-10 MPC Instrument Approach Data

All of the events which were analyzed from the sampled Squadron Aviation Resource Management (SARM) data fit an exponential distribution. A goodness-of-fit test was accomplished by means of the Chi-Square test ($\alpha = .05$) using the Sturges Rule. Nine of the forty seven defined data sets failed the Chi-Square test, so the author ran a Bartlett's test for those events which failed and only one of the forty seven defined data sets (Takeoff data set for AMC FPQCs) failed both of the tests. The Chi-square test statistic of the Takeoff data for AMC FPQCs was close to the cutoff and the researcher chose to accept the distribution for goodness-of-fit. Selected results of the Chi-Square goodness-of-fit test are in included in Table 8 and the entire set of tests can be found in APPENDIX H.

Table 8: Goodness-of-Fit Test Results

Test Results for AMC Data			
Crew Qual	Formation	Instrument App	Receiver AR
IPB	$\chi 2$ (4, N = 44) = 9.45, $p < .05$	$\chi 2$ (5, N = 92) = 9.32, $p < .10$	$\chi 2$ (5, N = 63) = 5.78, $p < .33$
MPC	$\chi 2$ (4, N = 38) = 2.72, $p < .61$	$\chi 2$ (6, N = 149) = 5.27, $p < .51$	$\chi 2$ (5, N = 90) = 4.32, $p < .51$
FPQC	$\chi 2$ (4, N = 25) = 3.32, $p < .51$	$\chi 2$ (6, N = 105) = 9.96, $p < .13$	N/A
Test Results for AFRC Data			
Crew Qual	Formation	Instrument App	Receiver AR
IPB	$\chi 2$ (4, N = 33) = 4.54, $p < .34$	$\chi 2$ (6, N = 98) = 6.23, $p < .40$	$\chi 2$ (5, N = 72) = 6.86, $p < .23$
MP	$\chi 2$ (3, N = 22) = 2.40, $p < .49$	$\chi 2$ (5, N = 73) = 5.57, $p < .35$	$\chi 2$ (5, N = 51) = 9.57, $p < .09$
FPQC	$\chi 2$ (4, N = 32) = 3.99, $p < .41$	$\chi 2$ (6, N = 131) = 7.91, $p < .25$	N/A

Determining the Mean

Confident that all of the defined data sets of sampled SARM events were truly exponential the author tabulated the means of the AMC and AFRC distributions for use in the Monte Carlo simulator. The calculated means are found in Table 9.

Table 9: Exponential Means for Training Events

μ for AMC Training Events							
Crew Qual	Formation	Takeoff	Instru App	Landing	Landing, night	Tanker AR	Rcvr AR
IPB	**17.98**	**12.26**	**12.00**	**11.59**	**21.73**	**10.67**	**15.79**
MPC	**31.63**	**9.21**	**10.24**	**9.24**	**20.05**	**6.28**	**16.01**
FPQC	**27.56**	**8.05**	**8.17**	**8.02**	**12.07**	**6.79**	**N/A**
μ for AFRC Training Events							
Crew Qual	Formation	Takeoff	Instru App	Landing	Landing, night	Tanker AR	Rcvr AR
IPA	**53.05**	**17.24**	**17.13**	**17.00**	**28.03**	**27.73**	**20.50**
IPB	**41.45**	**14.40**	**14.55**	**13.91**	**46.50**	**16.79**	**19.03**
MP	**51.64**	**14.43**	**16.55**	**16.11**	**54.65**	**20.95**	**22.63**
FPQC	**45.28**	**10.03**	**10.65**	**9.22**	**32.83**	**13.77**	**N/A**

Generating the Output

After mathematically defining the distribution curves, the author developed a Monte Carlo simulation in order to more easily analyze the event data. The author used the exponential formula expressed in Equation 1 for the Monte Carlo simulation which was run in Microsoft Excel:

Equation 1: Exponential Formula Used in Monte Carlo Simulation

$$= (-\mu)*LN(RAND())$$

The researcher input the calculated μ in order to model the expected distribution for each event. The Proposed Currency Period was input and became the evaluation variable used by the simulation to produce the completion percentage output. The model also returned the expected events which would be completed in 182 days (semi-annual period) and 365 days (annual period). The number of desired iterations was entered and the simulation model was run.

The outputs are labeled as: Completion Percentage w/rounding; Events in 182 days; and Events in 365 days. One thousand simulation runs were conducted using the proposed currency period for the defined data set in order to produce a completion percentage and event volume. The output produced by the model for the given inputs is a synthesis of the simulation runs expressed as the average and range for currency and event volume. A visual example of the Monte Carlo Currency and Volume Calculator is found in Table 10.

Table 10: Monte Carlo Currency and Volume Calculator

Currency and Volume Calculator (Exponential distribution)

Number of runs
1000

Mean	Proposed Currency Period	Completion Percentage w/ rounding	Events in 182 days	Events in 365 days		
8.17	30	97.6%	22.3	44.4	Average	
		99.4%	42	68	High	Range
		95.2%	7	25	Low	

Run Simulation

IV. Findings

"If you can't measure it, you can't improve it." - Lord Kelvin

Chapter Overview

The author used the Monte Carlo simulation with 1,000 simulated data points to determine the effect of a proposed currency period on the event completion percentage. The author wanted to have the ability to estimate a currency period which would provide an acceptable level of completion percentage, and he initially targeted a 95% or greater completion percentage. Additionally, the author wanted to compare the number of events which would be completed when using day count based currency against the number of events currently required by the AFI. In order to accomplish this comparison, the author used the same Monte Carlo simulation with 1,000 data points to determine the expected number of events which would be accomplished in a semi-annual (182 day) period and annual (365 day) period. The simulation used the same 1,000 data points to determine the event's range and mean for both the estimated currency and estimated volume of completion. The number of runs can be set for the Monte Carlo simulation but the author chose 1,000 as the baseline.

Model Output

Selected output generated by the Monte Carlo simulation has been summarized in Table 11. The author chose to examine three events that have dissimilar frequencies in order to determine if any associations exist. A discussion of key sample outputs will be addressed in the following sections.

Table 11: Monte Carlo Simulation Output

Event Analyzed	Type of System	Currency Period	Average Completion Percentage	Volume Accomplished in 365 days
FPQC Instrument Approach	FBCT	30 Days	97.6 %	44
	AMC CT	Monthly (28 – 61 days)	96.9 – 99.9 %	
	FBCT	30 Days	94.3 %	34
	AFRC CT	Monthly (28 – 61 days)	93.1 – 99.7 %	
MPC Instrument Approach	FBCT	45 Days	98.8 %	36
	AMC CT	Monthly (28 – 61 days)	93.9 – 99.8 %	
	FBCT	45 Days	93.6 %	22
	AFRC CT	Monthly (28 – 61 days)	82.1 – 97.6 %	
IPB Instrument Approach	FBCT	60 Days	99.4 %	31
	AMC CT	Monthly (28 – 61 days)	90.7 – 99.4%	
	FBCT	60 Days	98.4 %	25
	AFRC CT	Monthly (28 – 61 days)	85.9 – 98.5 %	
FPQC Formation	FBCT	90 Days	96.3 %	13
	AMC CT	Quarterly (90 – 183 days)	96.3 – 99.8 %	
	FBCT	90 Days	86.4 %	8
	AFRC CT	Quarterly (90 – 183 days)	86.4 – 98.2 %	
MPC Formation	FBCT	120 Days	97.8 %	12
	AMC CT	Quarterly (90 – 183 days)	94.4 – 99.7 %	
	FBCT	120 Days	90.3 %	7
	AFRC CT	Quarterly (90 – 183 days)	82.7 – 97.1 %	
IPB Formation	FBCT	135 Days	99.9 %	20
	AMC CT	Quarterly (90 – 183 days)	99.3 – 100 %	
	FBCT	135 Days	96.2 %	9
	AFRC CT	Quarterly (90 – 183 days)	88.7 – 98.8 %	
MPC Receiver AAR	FBCT	45 Days	94.2 %	23
	AMC CT			
	FBCT		86.6 %	16
	AFRC CT			
IPB Receiver AAR	FBCT	60 Days	97.8 %	23
	AMC CT			
	FBCT		95.8 %	19
	AFRC CT			

Current AMC Continuation Training

The first event studied was the instrument approach for three separate crew positions. Instrument approaches are a requirement for every crew position and in the current MAF continuation training system the event has a monthly currency. During a

full calendar year, a monthly currency could drive a minimum completion period of 28 days or up to 61 days. A 28 day period means that an event completed on 31 January must be re-accomplished no later than 28 February. A 61 day period means an event accomplished on 1 July will need to be re-accomplished no later than 31 August. This explains the range associated with the currency period. The model predicts that an average of 90.7% to 99.4% of AMC KC-10 instructor pilots will maintain their monthly instrument approach currency. These IPBs are required to accomplish 16 instrument approaches annually but on average they will accomplish 31 during the year which is 194% of the volume required (AMC/A3TK, 2012).

The next event studied was the formation for three separate crew positions. Formation events are a requirement for every crew position and in the current MAF continuation training system the event has a quarterly currency. During a full calendar year, a monthly currency could drive a minimum completion period of 90 days or up to 181 days. A 90 day period means that an event completed on 31 December must be re-accomplished no later than 31 March. A 183 day period means an event accomplished on 1 July will need to be re-accomplished no later than 31 December. This explains the range associated with the currency period. The model predicts that an average of 94.4% – 99.7% of AMC KC-10 mission pilots will maintain their quarterly formation currency. These MPCs are required to accomplish 6 formation events annually but on average they will accomplish 12 during the year which is 200% of the volume required (AMC/A3TK, 2012).

The author also examined receiver AAR because it is the only KC-10 event which presently has a day count associated with its currency. The completion percentage of the 45 day currency period for the receiver AAR event of an AMC KC-10 mission pilot was calculated to be 94.2%. These MPCs are required to accomplish 6 receiver AAR events annually but on average they will accomplish 23 during the year which is 383% of the volume required (AMC/A3TK, 2012).

Current AFRC Continuation Training

The first event studied was the instrument approach for three separate crew positions. The model predicts that an average of 85.9% to 98.5% of AFRC KC-10 instructor pilots will maintain their monthly instrument approach currency. These IPBs are required to accomplish 16 instrument approaches annually but on average they will accomplish 25 during the year which is 156% of the volume required (AMC/A3TK, 2012).

The next event studied was the formation for three separate crew positions. The model predicts that an average of 82.7% to 97.1% of AFRC KC-10 mission pilots will maintain their quarterly formation currency. These MPs are required to accomplish 6 formation events annually but on average they will accomplish 7 during the year which is 117% of the volume required (AMC/A3TK, 2012).

The author also examined receiver AAR because it is the only KC-10 event which presently has a day count associated with its currency. The completion percentage of the 45 day currency period for the receiver AAR event of an AFRC KC-10 mission pilot was calculated to be 86.6 %. These MPs are required to accomplish 6 receiver AAR events

annually but on average they will accomplish 16 during the year which is 267% of the volume required (AMC/A3TK, 2012).

Frequency-Based Continuation Training

Frequency-based continuation training uses a defined number of days to quantify the currency period associated with training events. Due to this specified time frame there is no range associated with the model's average completion percentage.

The first event studied was the instrument approach for three separate crew positions. The model predicts that the FBCT system will have an average of 99.4% of AMC KC-10 instructor pilots and 98.4% of AFRC KC-10 instructor pilots who would maintain a 60 day instrument approach currency under the FBCT system. Due to the model using the same distribution and mean as the AMC and AFRC data, the average volumes remain the same 31 and 25 respectively.

The next event studied was the formation for three separate crew positions. The model predicts that the FBCT system will have an average of 97.8% of AMC KC-10 mission pilots and 90.3% of AFRC KC-10 mission pilots who would maintain a 120 day formation currency under the FBCT system. Due to the model using the same distribution and mean as the AMC and AFRC data, the average volumes remain the same 12 and 7 respectively.

The final event studied was the receiver AAR for two separate crew positions which is currently conducted using a FBCT system. The completion percentage of the 45 day currency period for the receiver AAR event of an AMC KC-10 mission pilot was calculated to be 94.2%. The completion percentage of the 45 day currency period for the

receiver AAR event of an AFRC KC-10 mission pilot was calculated to be 86.6 %. Due to the model using the same distribution and mean as the AMC and AFRC data, the average volumes remain the same 23 and 16 respectively.

Summary

For the events examined, the model shows KC-10 pilots are accomplishing more volume than required by AFI 11-2KC-10 Vol 1. Additionally, AFRC KC-10 pilots are maintaining a at least an 82.7% currency rate for MP formation events and AMC KC-10 pilots are maintaining at least 90.7% currency rate for IPB instrument approaches. Selecting a FBCT system with a defined currency period would increase the currency rates to 90.3% and 99.4% respectively.

It can be seen that the FBCT concept has already been employed for the receiver AAR event. The benefits of which are a 94.2% currency rate for AMC MPCs and an 86.6% currency rate for AFRC MPs. Currency rates for IPBs are much higher with a 97.8% rate for AMC IPBs and 95.8% for AFRC IPBs.

V. Conclusions & Recommendations

Conclusion of Research

In order to understand the MAF flying continuation training system, the author examined representative events from the CT tables for the KC-10A MDS. An evaluation of the current KC-10 flying continuation training has led the author to conclude that it is not always the most effective, efficient, or flexible system. The author has concluded that an FBCT system shows the ability to be more effective, efficient, and flexible for specific events. The author therefore recommends the MAF consider an upgraded CT system which blends the strengths of both the current and the FBCT approaches.

Effectiveness Measurement

The measurement for effectiveness used in this paper was event completion percentage. The FBCT model was able to accurately track readiness when compared to that of the current CT system. The improved accuracy comes from the fact that FBCT is tracking readiness on a continuum and it does not rely on monthly, quarterly, and annual currency periods like the present CT system. The existing MAF system provides a rather wide range of completion percentage due to the dispersed day count that the present currency period utilizes. For example, the AFRC MP Formation currency was shown to lie somewhere within the range of 82.7% to 97.1%. By comparison, the FBCT model calculated the effectiveness of the formation currency to be 90.3%. The author has shown that the FBCT system can more accurately calculate effectiveness than the current MAF CT system.

Efficiency Measurement

The measurement for efficiency used in this paper was the volume of events accomplished. Currently, more events are being accomplished than the minimum number required per AFI 11-2KC-10V1. Any reduction in the number of events accomplished will lead directly to a reduction in flying hours and therefore a decrease in costs. Any update to the current CT system would more efficiently use the flying hours if it were to bring the actual accomplished events down closer to the number required by the 11-2MDS Vol 1.

The author assumed the distribution of event completion will not be affected by any change in currency period. According to the Monte Carlo simulation used in this paper, the FBCT model will not reduce the current number of events being accomplished unless the event's mean for completion increases. If the current worldwide operations tempo and customer training requirements remain constant then the distribution data for AMC pilots can be used to predict future event volume. Since the future is uncertain, the actual level of effort could decrease to a much lower peacetime tempo.

The distribution data for AFRC pilots could predict the future peacetime event volume. This would indeed drive a larger mean and smaller event volume. For example the AMC mean for the FPQC Instrument Approach is 8.17 and the AFRC mean for the FPQC Instrument Approach is 10.65. An increase of 2.48 in the mean led to a reduction of 23% of semi-annual events accomplished. This is a comparison of the 22 events per semi-annual period from the AMC data to 17 events per semi-annual from the AFRC data. This is based on the assumption that an FBCT system does not change the distribution of event completion. The author has shown that according to the model used

in this paper, there would be no change in the volume of events accomplished by adopting an FBCT and thus there is no difference in the efficiency of the two systems.

Flexibility Measurement

The primary measurement for flexibility used in this paper is the event completion percentage. The model used in this GRP allowed the author to determine that the current CT system provides more flexibility in the management of crew members for maintaining currency than the FBCT system. While the author has shown that FBCT provides a more effective picture of aircrew readiness, the range for event completion allowed by the current CT system allows a tremendous amount of flexibility. For example, the monthly currency for instrument approaches allows up to a 99.9% completion rate for AMC FPQCs. In comparison, the FBCT 30 day currency only allows for an expected completion rate of 97.6%.

A secondary means used in this paper for measuring flexibility is the volume of events accomplished. The current AMC CT system requires each crewmember to achieve a minimum volume count at the end of every semi-annual period in order to remain MR for the event. In the McChord SGTO, FBCT did not require the tracking of volume in order to determine NMR status. The FBCT system creates much more flexibility for the squadrons at the end of each semi-annual period.

The FBCT model increases flexibility for mission execution through the use of a waiver system. The McChord SGTO allowed NMR crew members to fly unsupervised on “CONUS and OCONUS missions on which events in the delinquent category are not accomplished (OG/CC approval not required for local, routine, and non-contingency

missions, but a waiver back to MR status is required for a stage or contingency mission)" (AMC/A3, 2010). The OG/CC was also specified as the waiver authority for up to one entire currency cycle (AMC/A3, 2010).

The author suggests a more conservative approach to the FBCT waiver process. The crew member's Squadron Commander would be the waiver authority for up to 110% of the currency period (rounded down) and the crew member's Operations Group Commander could waive up to 125% of the currency period (rounded down). This would provide greater mission execution flexibility than the current MAF CT system while adding squadron level risk management to the process. This is merely the author's assertion because he was not able to show an improvement in flexibility with the model.

Due to limitations in the model, the research was not able to determine which system provides the greatest flexibility for achieving required mission accomplishment. Future research is required to evaluate the benefits and challenges associated with the flexibility of mission execution while operating within the structure of the two CT systems.

Significance of Research

The research model was developed to estimate the effects of predicted event accomplishment on currency percentage and the number of events completed within a semi-annual and annual periods. The Monte Carlo simulation used in this research was able to compare the effectiveness, efficiency, and flexibility of two separate CT systems. The research proved that FBCT is more effective in predicting readiness of the crew force, and there is an equivalent efficiency between the two systems. Unfortunately, the

research was unable to predict which system has the greatest flexibility to provide service to the customer during mission execution.

The challenge of predicting the outcome of a revised CT program is the inability to know what the actual accomplishment data will look like and any research model will only forecast what could be. The distribution curve may stay the same, as observed with the AFRC and AMC data, or the actual data may morph into a completely new distribution curve which would need to be studied so a new model could be developed.

Recommendations for Actions

The author has a concern with the ARM database and training of SARM personnel. During the data collection phase for this GRP, the author was told by multiple SARM personnel that the database is unable to pull up archived completion dates for individuals. Therefore, it appeared virtually impossible for anyone to track the historical day count for accomplished events. This flaw makes continued data collection and analysis an extremely labor intensive and error-prone proposition.

After finally connecting with the ARMS experts at AMC, the author was presented with an Oracle browser that was proven to successfully pull the requested data from the ARMS database. Unfortunately, this knowledge was provided to the author so late in the GRP process that it was not used for the actual data collection. The author recommends either an upgrade to the ARM database or improved training of SARM personnel. Either action would be required in order to allow a data pull of the desired metrics so that individual and unit performance can easily be analyzed when using a FBCT system.

Recommendations for Future Research

"Reengineering is about inventing new approaches to process structure that bears little or no resemblance to those of previous eras" (Hammer & Champy, 1993, p. 52). FBCT is a new approach that bears little resemblance to the MAF continuation training process. The only way to know if it could work will be to conduct a trial with defined goals and data collection parameters. The KC-10 community is a perfect test bed for such an experiment because it is a small community with 59 aircraft which are flown by four AMC and four AFRC squadrons. Since there are two AMC and two AFRC located at each of the two main operating bases the test could be conducted by half the community at each location. The deployment distribution is equitably allocated between the two bases and the community conducts a range of missions and mission related events such as: coronet fighter drags; air-land cargo mission; tanker AAR; receiver AAR; and formation. The FBCT test units' results would be compared to those of the baseline MAF CT units in order to examine the outcomes of the two CT processes.

Developing the goals, parameters, and re-defining the CT table would be the task of multiple SMEs and a dedicated group in charge of running the overall project. Cost reduction can come from more simulator task trained events and fewer but targeted aircraft mission events. Simulators "allow pilots to hone skills, experience emergencies and perfect procedures without burning fuel and without exposing themselves to real danger. In real aircraft, you can shoot maybe two or three approaches in an hour. A simulator affords six or seven in the same time span" (Lee, 2013).

In order to understand which CT system is most successful, it will be necessary to set goals and develop the proper metrics to track in relation to achieving these goals. A

Delphi study and statistical analysis conducted on the metrics would aid in determining the success or failure of meeting the defined goals.

Summary

With an increased emphasis on reducing flying hour expenses and other costs there has been a greater shift to computer based training (CBT) and simulators. In order to maintain the link between training objectives, exercise design, and performance assessment there needs to be an increased focus on event-based approach to training (EBAT) in the CT process (Fowlkes, Dwyer, Oser, & Salas, 1998). FBCT could be the next evolution of continuation training and EBAT is an essential concept for use in the development of context-specific training which will reinforce the psychological concepts of recency and primacy. With the arrival of the technologically advanced KC-46 Pegasus, there will be an opportunity to blend a greater percentage of training into an EBAT system using a more robust CBT and simulator environment. The benefits of which are the ability to control the environment in which the instructor can identify and introduce events and observe the individuals' behavior (Fowlkes, Dwyer, Oser, & Salas, 1998). This would be incorporated to provide a greater focus on competency and not completion.

The biggest challenge for any process is the inability to forecast the actual demand. In our discussion, demand for a ready crew force must be measured to determine if you are meeting the requirement of the customer for the specific MDS such as the KC-10A. The reduction of forces required for OEF is easy to forecast, but what will the rest of the world look like? For example, Russia's actions in the Ukraine were

not forecast and there still is not a clear picture of will occur in the region long-term. An attempt can be made to predict China's actions in the Pacific but their future goals are unknown as well. These types of challenges drive the necessity for a CT system that is focused on achieving COCOM requirements.

The author has shown that FBCT demonstrates promise in areas and would assist the creation of a modernized CT system for the MAF. More research will be required in order to determine the real-world impact of a FBCT system on aircrew readiness. The author recommends AMC conduct a small-group tryout using KC-10 aircrew in order to determine the strengths, weakness, and applicability of instituting a FBCT system. The author would recommend the small-group tryout be conducted by both AMC and AFRC in order to fully understand the impacts of the system. One AMC and one AFRC squadron at each KC-10 base (Joint Base MDL and Travis AFB) should be selected.

The author has provided an example KC-10 pilot FBCT table in APPENDIX I of this paper for consideration. SMEs would need to be assigned to develop the training tables and conduct the test. The author recommends the test run for a minimum of one-year before committing the entire MAF to a FBCT system.

APPENDIX A: AFI 11-2KC-10 Vol 1 (AMC/A3TK, 2012)

Table 4.4. KC-10 Pilot Semi Annual Continuation Training Flying Requirements.

		Aircraft Commander (FPL+)					Pilot (FPC+)				Creditable in WST			
Code	Event	A	B	C	E	CUR	A	B	C	CUR	%	Maintain	Regain	Notes
F020	Formation	2	2	3		Q	2	2	3	Q	50/33%	Y	N	15,19
F030	Large Formation	A	A	A		A	A	A	A	A	100/0%	Y	N	15,20
F060	AAR Formation	1	1	2			1	1	2		100%	Y	Y	15
G240	CRM WST	A	A	A		A	A	A	A	A	100%	Y	Y	11,21,23
G250	Refresher WST	Q	Q	Q		Q	Q	Q	Q	Q	100%	Y	Y	8,17,23
M010	Proficiency Sortie	2	2	2			2	2	2		100%	Y	Y	14,15
M020	Unit-Specific Sortie	4	4	4			4	4	4					
M030	Oceanic Sortie	1	1	2			1	1	2					3, 6,22
M050	Tactical Sortie	A	A	A		A	A	A	A	A	100%	Y	Y	6,15,18
N010	Tanker RV	4	5	6		Q	4	5	6	Q	100%	Y	Y	
N020	Tanker/Receiver RV Golf (En-route)	1	1	2			1	1	2		100%	Y	Y	
N030	Tanker RV Delta (Point Parallel)	1	1	2			1	1	2		100%	Y	Y	

		Aircraft Commander (FPL+)					Pilot (FPQ)				Creditable in WST			
Code	Event	A	B	C	E	C U R	A	B	C	C U R	%	Maintain	Regain	Notes
N010	Tanker RV	4	5	6		Q	4	5	6	Q	100%	Y	Y	
N020	Tanker/Receiver RV Golf (En-route)	1	1	2			1	1	2		100%	Y	Y	
N030	Tanker RV Delta (Point Parallel)	1	1	2			1	1	2		100%	Y	Y	
N040	Tanker RV Alpha (Anchor)	1	1	1			1	1	1		100%	Y	Y	
P004	MPD Taxi						2	4	4					
P005	Taxi Exercise	1	2	2			2	2	2					16
P010	Takeoff, Initial	2	4	6	2	Q	2	4	6	Q	100%	Y	Y	15
P020	Takeoff	8	10	12	6	M	8	10	12	M	100%	Y	Y	5,15
P028	Right Seat Takeoff										100%			7,15
P029	Left Seat Takeoff						2	3	3	Q	100%	Y	Y	15
P061	VFR Overhead	A	A	A		A	A	A	A	A	100%	Y	Y	15,
P062	Tactical Departure	A	A	A		A	A	A	A	A	100%	Y	Y	6,9,15,18
P063	Tactical Arrival	1	1	1			1	1	1		100%	Y	Y	6,10,15,18
P064	Slide	1	1	1			1	1	1		100%	Y	Y	6,15,18
P065	Single-Ship Scram	1	1	1			1	1	1		100%	Y	Y	6,15,18
P066	Steep Turn	1	1	1			1	1	1		100%	Y	Y	15
P067	Contingency Rejoin	A	A	A		A	A	A	A	A	100%	Y	Y	6,15,18
P068	Combat Descent	A	A	A		A	A	A	A	A	100%	Y	Y	6,9,15,18
P069	Defending Climb	A	A	A		A	A	A	A	A	100%	Y	Y	6,9,15,18
P070	Instrument Appr	6	8	12	6	M	6	8	12	M	100%	Y	Y	5,15
P080	Inst Appr-Auto	2	2	2			2	2	2		100%	Y	Y	15
P090	Inst Appr-Manual	2	2	2			2	2	2		100%	Y	Y	15
P100	Precision Approach	3	3	3	2		3	4	6		100%	Y	Y	15
P110	Non-precision Approach	3	3	3	1		3	3	3		100%	Y	Y	15
P116	NDB Approach	1	1	1			1	1	1		100%	Y	Y	15
P117	GPS Approach	1	1	2			1	1	2		100%	Y	Y	15
P130	Circling Approach	1	2	2			1	2	2		100%	Y	Y	15
P140	Vis Traffic Pattern	2	2	2			2	2	2		100%	Y	Y	15
P150	Missed Approach—Auto	1	1	2			1	1	2		100%	Y	Y	15
P160	Missed Approach—Manual	1	1	2			1	1	2		100%	Y	Y	15
P190	Landing	8	10	12	6	M	8	10	12	M	100%	Y	Y	5,15

		Aircraft Commander (FPL+)					Pilot (FPQ)				Creditable in WST			
Code	Event	A	B	C	E	CUR	A	B	C	CUR	%	Maintain	Regain	Notes
P192	Landing, Night	2	2	2	2	Q	2	2	2	Q	100%	Y	Y	15
P198	Right Seat Landing										100%			7,15
P199	Left Seat Landing						2	3	3	Q	100%	Y	Y	15
P200	Touch-and-Go					M					100%	Y	Y	4,15
P260	HAVE QUICK Radio Procedures	A	1	1			A	1	1					
P270	Secure Radio Operation	A	1	1			A	1	1					
P280	ACDTQT	T	B	A			T	B	A		100%	Y	Y	
R010	Receiver AAR	4	5	6		45D					100%	Y	N	2,5,13,15
R013	Rcvr AAR, Aircraft	2	2	3		Q								2,12
R020	Rcvr AAR, Night	1	2	3							100%	Y	Y	2,15
R030	Rcvr AAR, Heavyweight	A	A	1							100%	Y	N	2,15
R040	Rcvr AAR, Breakaway	1	1	1			1	1	1		100%	Y	Y	2,15
R050	Rcvr AAR, Tanker AP off	1	2	2										2
R055	Rcvr AAR, Anchor AARA	1	1	2							50%	Y	N	1,2,15
R060	Tanker AAR	4	5	6		Q	4	5	6	Q	100%	Y	Y	15
R070	Tanker AAR, Breakaway	2	2	2			2	2	2		100%	Y	Y	15
R080	Tanker AAR, AP Off	1	1	1			1	1	1					
R090	Tanker AAR, Slow Speed	1	1	1			1	1	1		100%	Y	Y	15

A-Annual, B-Biennial, D-Days, M-Monthly, N-No, Q-Quarterly, T-Triennial, Y-Yes; See Terms for frequency definitions

NOTES: The OG/CC or equivalent is the waiver authority for events in **Table 4.4**. See paragraphs **1.5.2** and **4.9.3**. Currencies do not apply to FTL E crewmembers. FTL E training requirements are insufficient for MR status and crewmembers assigned to this FTL will fly with an instructor of like specialty at all times.

1. FTL A and B individuals can credit 100% in the WST.

2. Crewmembers who qualified through a senior staff course are not permitted to accomplish receiver AAR with passengers onboard the aircraft.

3. Two oceanic sorties may be credited if total mission time exceeds 30 flight hours (AFRC crewmembers may log two oceanic sorties if total mission time is less than 30 flight hours) and the pilot logs primary, secondary, instructor, or evaluator time during oceanic crossings.

4. Applies to touch-and-go certified aircraft commanders only. Does not apply to Instructor or Evaluator Pilots. Loss of currency does not result in loss of mission ready status.

5. Loss of currency exceeding six months in the following events requires requalification training according to paragraph 2.9: P020, P070, P190 and R010 (only applies to those individuals who have a current Form 8 with a receiver AR qualification.

6. Not required for BMC crewmembers, Senior Officers, or pilots assigned to MAJCOM Headquarters, NAF, 618th AOC (TACC), and USAF Expeditionary Center.

7. No minimum number required or established; applies to all pilots (to include aircraft commanders and higher). May be logged in the aircraft or WST. Dual log P028/P029 with P010/P020 and P198/P199 with P190/P192. Goal is to track pilots' accomplishment of events in both seats.

8. Semi-Annual requirement for pilots assigned to MAJCOM Headquarters, NAF, 618th AOC (TACC), and USAF Expeditionary Center.

9. WST only.

10. Low Altitude/High Speed Arrival option is WST only.

11. CRM training conducted by the ATS contractor as part of yearly refresher missions. G240 requires prerequisite academics (G230), which is conducted as part of the pre-briefs for the CRM refresher missions. Pilots dual log G240 with G250.

12. Dual log R010 when accomplish R013.

13. Sixty (60) day currency for FTL A/B Aircraft Commanders (MP) and above.

14. If accomplishing an M010 in the WST, pilots should focus on instrument proficiency with all engines/systems operating. This event is not intended to be logged while handling multiple aircraft malfunctions.

15. WST requires full operational motion and visual systems in order to credit the event.

16. MPD Pilots will dual log a P004 when performing P005.

17. MPD Phase II Pilots should accomplish at least half of their G250 WST periods in the left seat to provide seasoning for aircraft commander certification. G250 is not required if Phase IA of qualification or upgrade training was accomplished during that quarter.

18. As a minimum, MPD Pilots require proficiency in PNF duties for tactical maneuvers. Aircraft Commanders require proficiency in PF duties for tactical maneuvers.

19. FTL A & B individuals can log 50% (1 event per semi-annual period) in the WST whereas FTL C individuals can only log 33% (1 event per semi-annual period) in the WST.

20. Not an annual continuation training flying requirement unless certified in large formation. FTL C individuals cannot log F030 in the WST.

21. G230 and G240 are not required if Phase IA of qualification or instructor upgrade training was accomplished during that year.

22. Annual requirement for pilots assigned to MAJCOM Headquarters, NAF, 618th AOC (TACC), and USAF Expeditionary Center.

23. Must be accomplished with at least one qualified Aircraft Commander on the crew. (ARC may substitute an FTL A FPQ for an AC, if needed).

APPENDIX B: SACR 51-135 VOL IV (SAC/DOST, 1983)

CHAPTER 6

MISSION-READY FLYING TRAINING REQUIREMENTS

6-1. MISSION-READY REQUIREMENTS (KC-135A/Q/D):

a. Pilot:

CODE	EVENT	NO.	ARF ONLY NO.	FREQ NO DAYS
I09	Nonprecision Approach	3	6	
I10	Missed Approach	2	4	
*I14	Instrument Approach			1/45
I23	Precision Approach	3	6	
M14	Alert Start, Cartridge	1	2	
P02	Sortie (ARF only)		18	
P02	Sortie (N/A ARF) Select Sensor Ready	 8 9 10		
*P08	Takeoff	2	4	1/45
*P13	Landing (Non-fan)			1/45
*P82	Landing (Fan)(KC-135E)			1/45
P83	Landing	4	8	
†P16	Landing (Night)			1/180
*P17	Instructor Duties			1/60 1/90 (ARF)
P22	Cell Formation			1/180
$P24	MITO			1/365
P26	Cell Departure and Join up			1/180
*P49	Landing, Reverse Thrust (KC-135E)			1/90
$P55	Max Mode Takeoff 30° Flaps			1/365
P82	Chemical Defense Exercise			1/365
P70	Pilot Proficiency Exercise	1	2	
*P07	Touch and Go Landing			1/45
*P58	Opposite Seat Exercise (Dual Qualified) (N/A ARF)			1/45 1/60 (ART)
*R01	Receiver Air Refueling Opt (Day/Night)	4		1/60
R09	Receiver Air Refueling, Heavyweight			1/365
R19	Air Refueling Formation Tanker Cell			1/180
$R41	Tanker Air Refueling	3	6	1/45
R42	Primary Rendezvous	1	2	
*R50	Receiver Air Refueling Tanker Autopilot Off			1/180
b. Copilot:				
I09	Nonprecision Approach	1	6	
I10	Missed Approach	2	4	
*I14	Instrument Approach			1/45
I23	Precision Approach	3	6	
M14	Alert Start Cartridge	1	2	

CODE	EVENT	NO.	ARF ONLY NO.	FREQ NO DAYS
P02	Sortie (ARF Only)		18	
P02	Sortie (N/A ARF)			
	Select	8		
	Senior	9		
	Ready	10		
P08	Takeoff	2	4	
P16	Landing, Night			1/180
P62	Chemical Defense Exercise			1/365
P70	Pilot Proficiency Exercise	1	2	
* P83	Landing	3	6	1/45
* P98	Opposite Seat Exercise (Dual Qualified)(NA ARF)			1/45 1/60 (ART)
	c. Navigator:			
N13	Celestial Fixes	1	2	
N51	Celestial Nav Leg	3	6	
N53	Night Celestial Nav Leg (dual log with N51)	1	1	
N66	INS Airborne Alignment			1/365
* P02	Sortie (ARF Only)		18	1/45
* P02	Sortie (N/A ARF)			
	Select	8		1/45
	Senior	9		1/45
	Ready	10		1/45
* P17	Instructor Duties			1/90
P22	Cell Formation			1/180
P27	ARA	1	2	
P62	Chemical Defense Exercise			1/365
R09	Tanker Electronic Rendezvous (KC-135Q with SR-71)	1		
R12	Point Parallel Rendezvous	2	4	
R19	Air Refueling Formation/ Tanker Cell			1/180
$ R33	Rendezvous			1/45
R36	Enroute/On Course Rendezvous			1/180
R37	Receiver Directed Rendezvous	1		
R40	Tanker Alternate Rendezvous	1	2	
R42	Primary Rendezvous			1/60
R57	Restricted Communications Rendezvous			1/180
T43	Target Timing W/V Run	1	2	
	d. Boom Operator:			
N28	Celestial Observation	1	2	
P02	Sortie (ARF Only)		18	
P02	Sortie (N/A ARF)			
	Select	8		
	Senior	9		
	Ready	10		

CODE	EVENT	NO.	ARF ONLY NO.	FREQ NO DAYS
*P17	Instructor Duties			1 90
P62	Chemical Defense Exercise			1 365
*R25	Contacts	9	18	1 45
*R26	Contacts (Night)	3	6	1 90
R27	Tanker Manual Operation Contact (Boom & R)	3	6	
*R29	Contact (Fighter)			1 180
R41	Tanker Air Refueling	3	6	
R58	Restricted Communications Air Refueling			1 180

*Currency Event

§Readiness Event.

†Requires instruction supervision if frequency is exceeded.

NOTE 1: P24, M14, and R40 not applicable to KC-135Q units supporting SR-71 receivers.

NOTE 2: P22 credit may be awarded on operational deployments redeployments (Task Force, etc.) to all participating aircrews. Requirements outlined in volume I, attachment 1 do not apply.

NOTE 3: R56, R57, and R58 not applicable to 9 SRW and 376 SW.

NOTE 4: Loss of currency in P98 does not preclude unsupervised activity in assigned seat.

NOTE 5: R01, R08, R47, and R50 applicable to receiver qualified KC-135A Dcrewmembers only. Currency in events R01 and R50 not required to assume tanker alert

NOTE 6: R57 and R58 are creditable on Bullet Ridge air refuelings provoding volume I requirements are satisfied.

NOTE 7: M14 will only be accomplished in conjunction with an alert response. Individual crew members who do not accomplish the M14 requirement on alert, may take credit for the event if accomplished in the Cockpit Procedures Trainer.

NOTE 8: For ANG KC-135E conversion units only: Currency in Event P13, Non fan Landing is not required to perform KC-135A EWO alert, provoding the crew member is current and qualified in Event P82, Landing Fan. This waiver does not apply to operational and training flights.

APPENDIX C: AFI 11-2E-3 Vol 1 (ACC/A3CA, 2012)

Table 4.2. Pilot Currency Requirements.

TRAINING EVENT	NOTES	CURRENCY
Take Off	1, 6	1/45 days
Instrument Approach	6	1/45 days
Landing	6	1/45 days
Night Landing	3, 6	1/120 days
Touch and Go Landing	5, 6	1/45 days
Air Refueling	2, 6	1/45 days
Night Air Refueling	2, 3, 6	1/120 days
Autopilot-Off Air Refueling	2, 6	1/180 days
Sortie	4, 6	1/60 days

1. Log a takeoff when controlling the aircraft on any takeoff to include Touch and GOs.
2. Log Air Refueling with Night Air Refueling and/or Autopilot Off Air Refueling when applicable.
3. Not applicable to 962 AACS.
4. Lookback for CMR aircrew. See paragraph **4.7.2** and **Table 4.5.**
5. IPs only.
6. Expiration of currency does not require CMR/BMC regression.

APPENDIX D: AS-14.1 AWACS RTM (HQ ACC/A3C, 2014)

Table 5.4. Pilot Flight Events.

TRAINING EVENT	TASK ID	CURRENCY	CMR/I Aircrew	CMR/E Aircrew	BMC Aircrew	Notes
Sortie	SX00	1/60 days	24	12	6	
Lookback	SR00					
Takeoff	TO01	1/45 days	9	6	3	1
Retrograde Procedures	RA31	1/180 days	3	2	2	9, 10
Instrument Approach	AP31	1/45 days				3
Precision Approach	AP01		9	6	3	3, 4
Non-Precision Approach	AP02		5	3	2	3, 4
Circling Approach	AP21		3	2	1	4
Landing	LD01	1/45 days	9	6	3	8
Night Landing	LD02	1/120 days	3	2	1	6, 8
3-Engine Landing	LD29		3	2	1	8
3-Engine/Missed Approach	AP23		3	2	1	
Touch and Go Landing	LD03	1/45 days				5
Air Refueling	AR01	1/45 days	5	3		2, 7
Night Air Refueling	AR02	1/120 days	3	2		2, 6, 7
Autopilot-Off Air Refueling	AR04	1/180 days	2	1		2, 7
Pilot Proficiency Event	SR70		5	3	2	5

Notes: First pilots and experienced co-pilots will fly the CMR/I Rate.

1. Log a takeoff when controlling the aircraft for initial takeoffs and Touch and Go's.
2. Log Air Refueling with Night Air Refueling or Autopilot Off Air Refueling when applicable.
3. Log an Instrument Approach with a Non-Precision or Precision Approach.
4. Log a Circling Approach with a Non-Precision Approach or Precision Approach when flown together.
5. Touch and go & pilot proficiency events will be accomplished under the supervision of an E-3 IP/FLIGHT EXAMINER. IP/FLIGHT EXAMINERs may log a touch and go by controlling or monitoring the aircraft from either pilot seat.
6. Night Air Refueling and Night Landing currency is not applicable to 962 AACS. However, 12 month training event requirements will still be met.
7. RAP Air Refueling training event requirements apply to all AC/IP/FLIGHT EXAMINERs. AR qualified FPs/CPs will maintain Air refueling, Night Air Refueling and Autopilot-off Air Refueling currencies but do not have to meet RAP requirements.
8. Log landing with a simulated 3-engine landing, night landing, or when controlling the aircraft on a touch & go.
9. This is to be accomplished where the flight crew can practice the coordination with the mission crew. In all cases, the retrograde procedure will be thoroughly debriefed.
10. Instructors may log 100% when actively instructing.

APPENDIX E: AFI 11-2MC-130 Vol 1 (AFSOC/A3T, 2012)

Table 4.2. MC-130 Flying Currency Requirements in days by FTL.

See MDS-specific RTM for more detailed currency and volume flying requirements by FTL.

EVENT	ARMS ID	P/CP		Nav		EWO		FE/ AMSS		LM		Notes
		A/B	C	A/B	C	A/B	C	A/B	C	A/	C	
BAQ												
Aircrew Proficiency Sortie	ST14	60	45	60	60	60	60	60	60	60	60	1,2
Total Takeoffs	TO00	60	45									1,2
Instrument Approaches	AP10	60	45									1,2
Total Landings	LD00	60	45									1,2
Left Seat Landing (FP)	LD60	45	45									5
Mission												
Combat Mission Profile	ST51	90	60	90	60	90	60					1,3
Mountain NVG Low Level	NV11	120	90	120	90	120	90					5,6
NVG Takeoff	NV15	90	60									5
NVG Landing	NV20	90	60									5
Self Contained Approach	AP80			90	60	90	60					4,6
Special Mission												
Air-to-Air Refuleing	AR00	90	90									4

Notes: See AFI 11-202, Vol. 1, as supplemented, for Flight Surgeon, Medical Technician, and Combat Camera Aerial Photographer training requirements.

1. Only these events require an evaluation if loss of currency exceeds 6 months per AFI 11-202, Vol. 1.

2. Failure to accomplish event, within specified time, results in loss of basic aircraft currency.

3. Failure to accomplish event, within specified time, results in loss of mission currency.

4. Noncurrency in this event results in loss of currency in this sub area.

5. Noncurrency in this events results in loss of currency in only that event

6. MC-130H EWOs only. MC-130E EWOs do not have this currency requirement.

APPENDIX F: MC-130J RTM (HQ AFSOC/A3T, 2014)

Table 4.2. Semiannual MC-130J & C-130J BAQ Flying Requirements by FTL.

EVENT Volume by FTL	ARMS ID	DUAL LOGS	Pilot/CP			CSO			Currency		Notes
			A	B	C	A	B	C	A/B	C	
Simulator Sortie	ST03		6	6	6	6	6	6			5
Aircrew Proficiency Sortie (APS)	ST14		6/5	9/6	12/6				60d	45d	1,2,3
APS	ST14					6/3	9/6	12/6	60d	45d	1,2, 3
Local Proficiency Sortie	ST15		1/0	2/1	2/1						3
EPE	ST94		1	2	3						3
EPE	ST94					1	2	3			3
PILOT PRO EVENTS											
Total Takeoffs	TO00		8/4	12/6	16/8				60d	45d	1,2,3
- Night Takeoffs	TO05	TO00	2	3/2	4/2						3
- Left Seat Max Effort T/O (FP)	TO23	TO00	0	0	6/4						3
Instrument Approaches	AP10		8	12/8	16/8				60d	45d	1,2,3
- Precision Approaches	AP20	AP10	4	6	8/4						3
- Non-Precision Approaches	AP21	AP10	4	6	8/4						3
Circling Maneuver	AP30		1	1	2/1						3
Category II ILS Approaches	AP18	AP10 AP20	1	1	2/1						3,4
Holding Pattern	AP35		1	1	2/1						3
Missed Approach	AP40		1	1	2/1						3

PILOT PRO EVENTS Cont.											
Total Landings	LD00		8/4	12/6	16/4				60d	45d	1,2,3
- Night Landings	LD05	LD00	2	3/1	4/1						3
- Left Seat Normal Landing (FP)	LD60	LD00	0	0	6/3				45d	45d	3
- Left Seat Night Landing (FP)	LD06	LD00 LD05 LD60	0	0	0						
- Left Seat Night Max Effort Lnd (FP)	LD22	LD00 LD05 LD06 LD23 LD60	0	0	0						
- Left Seat Max Effort Lnd (FP)	LD23	LD00 LD60	0	0	6/2						3
EVENT Volume by FTL	**ARMS ID**	**DUAL LOGS**	**LM**						**Currency**		**Notes**
			A		**B**		**C**		**A/B**	**C**	
Simulator Sortie	ST03		3		3		3				5
Aircrew Proficiency Sortie	ST14		6/3		9/4		12/3		60d	60d	1,2,3
Emergency Procedure Event	ST94		1		2		3				3

d-due in number of days

Notes: See AFI 11-202, Vol 1, AFSOC Sup, for Flight Surgeon (FS), Medical Technician, and Combat Camera Aerial Photographer Training requirements.

1. Only these events require an evaluation if loss of currency exceeds 6 months per AFI 11-202, Vol 1, para 3.4.3.2. See para 2.2 for evaluation requirements.
2. Failure to accomplish event, within specified time, results in loss of basic aircraft currency.
3. Aircrew may update currency or obtain re-currency in a MC-130J WST (Pilot/CP may also do so in any C-130J WST). A single number indicates all events can be logged in WST. If a second number is listed, it is the maximum allowable in the WST. For example, Aircrew Proficiency Sortie 12/6, 12 is total semi-annual requirement and 6 is maximum that may be credited in a MC-130J WST.
4. Non-currency in any event in this sub area results in loss of currency in only that event.
5. Does not apply to aircrew assigned to 19 SOS, 551 SOS or any unit without a co-located simulator; failure to accomplish required volume, results in loss of currency in this event only.

Table 4.3. MC-130J & C-130J Mission Flying Requirements by FTL: Pilot/Copilot.

EVENT	ARMS ID	DUAL LOGS	Msn Pilot			Msn CP	Currency		Notes
			A	B	C	C	A/B	C	
CORE MISSION EVENTS									
Combat Mission Profile	ST51		3	4/2	6/3	6/3	90d	60d	1,4
- Mountain NVG LL	NV11		1	2/1	3/1	3/1	120 d	60d	2,4
- Threat/Coastal Penetration	ST74		0	0	0	0			3,4
Self Contained Approach (SCA)	AP80		2	3/1	4/2	4/2			2,4
- SCA Go-Around	NV35		1	1	1/0	1/0			2,4
Integrated Precision Radar Approach (IPRA)	AP71		1	1	1/0	1/0			2,4
Tactical Recovery	AP99		1	2/1	2/1				3,4
Total Maximum Effort Takeoff	TO20	TO00	3	4/3	6/4				2,4,5
- Night Maximum Effort Takeoff	TO22	TO00 TO05 TO20	2	3/2	4/3				3,4,5
Total Maximum Effort Landing	LD20	LD00	3/1	4/1	6/1				2,4

- Night Maximum effort Landing	LD21	LD00 LD05 LD20	2/1	3/1	4/1				3,4
EVENT	**ARMS ID**	**DUAL LOGS**	**Msn Pilot**			**Msn CP**	**Currency**		**Notes**
			A	**B**	**C**	**C**	**A/B**	**C**	
CORE MISSION EVENTS Cont.									
NVG Takeoff	NV15	TO00 TO05	3	4/2	6/3	6/3	90d	60d	3,4
NVG Landing	NV20	LD00 LD05	3/1	4/1	6/1	3/1	90d	60d	3,4
Total Airdrop	AD00		3	6/3	6/1	6/1			2,4
- Actual Airdrop	AD02		1	1	1	1			2
- Personnel Airdrop	AD11	AD00 AD02	1	1	2/0	2/0			3,4
- Sim Pers Airdrop	AD09	AD00 AD11	0	0	0	0			
- Reduced Flap Setting Airdrop	AD31	AD00 AD02	1	2/1	2/1	2/1			3,4
- HSCDS Airdrop	AD53	AD00 AD02	1	1	1	1			3
- XCDS Airdrop	AD54	AD00 AD02	1	1	1	1			3
- Sim Reduced Flap Setting Airdrop	AD35	AD00 AD31	0	0	0	0			
- Heavy Equipment Airdrop	AD60	AD00 AD02	1	2/1	2/1	2/1			3,4
- Heavy Equipment Towplate Airdrop	AD62	AD00 AD02 AD60	1	1	1	1			3,4
- Sim Heavy Equipment Airdrop	AD63	AD00 AD60	0	0	0	0			
- Sim Heavy Equipment Towplate Airdrop	AD64	AD00 AD62	0	0	0	0			
Formation Airdrop	AD95		1	2/1	2/1	2/1			3,4
Total HAAR/TAAR	AR99		2	3/1	4/2	3/1			2,4
- HAAR	AR20	AR99	0	0	1	1			3
- TAAR	AR21	AR99	0	0	1	1			3
- NVG HAAR/TAAR	NV06		1	2/1	2/1	3/2			3,4
- NVG HAAR	NV07	AR20 AR99 NV06	0	0	0	0			
- NVG TAAR	NV08	AR21 AR99 NV06	0	0	0	0			
Total Air-to-Air Refueling (AAR)	AR00		2/1	4/2	4/2		90d	90d	2,4
- Night AAR	AR05	AR00	1/0	2/1	2/1				3,4
Formation Rejoin	ST97		2/1	3/1	4/2	4/2			3,4

- Total NVG Form HAAR/TAAR	AR23		1	2/1	2/1	2/1			3,4
- Actual NVG Form HAAR/TAAR	AR24		1	1	1	1			3
EVENT	**ARMS ID**	**DUAL LOGS**	**Msn Pilot**			**Msn CP**	**Currency**		**Notes**
			A	**B**	**C**	**C**	**A/B**	**C**	
CORE MISSION EVENTS Cont.									
- NVG Form HAAR	AR25	AR20 AR23 AR24 AR99 NV06	0	0	0	0			
- NVG Form TAAR	AR26	AR21 AR23 AR24 AR99 NV06	0	0	0	0			
- Sim NVG Form HAAR/TAAR	AR27	AR23	0	0	0	0			
- Wx Pen/Lost Contact	AR40		1	2/1	2/1	2/1			2,4
Anti-Jam	CS11		1	1	1	1			3,7
Secure Comm/ SATCOM	CS08		1	1	1	3			3,6,7
Surface Radar Event	EW02		1	1	2/1	2/1			3,4
SPECIAL MISSION EVENTS									
Min Interval Landing	LD40		1	2	2	0			3
Total AAR (CP)	AR00					4/2	90d	90d	2,4
- Night AAR (CP)	AR05	AR00				2/1			3,4

d-due in number of days

Notes: Only note 1 events require an evaluation (mission unqualified) if loss of currency exceeds 6 months (see AFI 11-202,Vol 1, para 3.4.3.2.). Other events require showing proficiency to an instructor IAW AFI 11-202, Vol 1, para 3.4.3.1., to regain currency.

1. Non-currency in any event in this sub area results in loss of mission currency.
2. Non-currency in any event in this sub area results in loss of currency for this sub area only.
3. Non-currency in any event in this sub area results in loss of currency in only that event. For loadmasters only, a currency event in HAAR or TAAR counts as currency for both events.
4. Aircrew may update currency or obtain recurrency in a MC-130J WST. A single number indicates all events can be logged in WST. If a second number is listed, it is the maximum allowable in the WST. For example, Combat Mission Profile 4/2, 4 is total semi-annual requirement and 2 is maximum that may be credited in the WST.
5. Aircrew may update currency or obtain recurrency in a C-130J WST.
6. Secure Comm/SATCOM [CS08] - Pilots require voice currency only.
7. Aircrew may update currency or obtain recurrency using a static MC-130J aircraft.

APPENDIX G: SGTO CONOPS Change 2 (AMC/A3, 2010)

Table 9.3, Pilot Flying Training Currency Cycles

Airland Events		Flying Training Level				
Code	**Event**	**C**	**B**	**A**	**Notes**	**SIM**
P020	Takeoff	60	60	60	1, 2	M+R
P070	Instrument Approach	60	60	60	1, 2	M+R
P190	Landing	60	60	60	1, 2	M+R
P192	Night Landing	90	90	90	1, 2	M+R
NV47	NVG Takeoff	90	120	150	1, 2, 9	M+R
NV48	NVG Landing	90	120	150	1, 2, 9	M+R
R010	AR		45	60	2, 3, 7, 9, 13	See Notes
R020	Night AR		120	180	2, 3, 4, 9, 13	See Notes
R050	Auto Pilot Off AR		180	180	2, 13	N
M030	Overseas Sortie	365	365	365	11	N
M040	PNAF SORTIE	180	180	180	10	N
AS11	ALZ		90	120	2, 9, 13	M
NV49	ALZ (NVG)		90	120	2, 9, 13	M
P260	Have Quick	365	365	365		M+R
P270	Secure Radio Operation	365	365	365		M+R
Airdrop Events						
AD15	Airdrop Prof Sortie (DPS)	90	120	150	2, 6	M
AD09	Med/Hi-Alt Airdrop	365	365	365	1	M
AD95	Dual Row (if qualified)	240	240	240	1	M
AD11	PADS Unguided (if qualified)	240	240	240	1	M
AD12	PADS guided (if qualified)	365	365	365	1	M
NV18	NVG Airdrop Event	240	240	240	1	M
Formation Events						
F015	Formation Sortie	180	180	180	2, 8, 9	M
F080	AD Vis Wing	240	240	240	14	M
F100	AD Vis Wing Night	240	240	240		M
F110	AD SKE/FFS Lead	240	240	240	1	M
F130	AD SKE/FFS Wing	240	240	240	1	M
F135	Multi-Element SKE/FFS	240	240	240	1	M
F136	Multi-Element Vis	240	240	240	14	M
R015	Formation Air Refueling	240	240	240	14	M

M=Maintain, R= Regain, M+R=Maintain & Regain, N=Not Creditable in Simulator

Notes:

1. May maintain & regain currency 100% in WST (fully creditable).
2. Loss of qualification if non-current in excess of 6 months. Loss of currency in excess of 6 months for Airdrop Events only affects airdrop qualification of member. Loss of currency in any Formation event only affects Formation qualification (in other words member can still do airdrops but not be part of a formation).

3. **This note reflects Change 1**: AR accomplished in aircraft extends currency by full cycle. AR accomplished in WST will extend currency up to a full cycle if member is current. If an IP accomplishes AR in the aircraft then he/she just earned 60 additional days of currency. If the IP accomplishes an AR in the WST on day 60 then he/she is current until day 120. This IP just maximized his/her currency with only two AR events. For the next example, the IP accomplishes AR in the aircraft. On day 20 this IP accomplishes AR in the WST, extending his/her currency until day 80. If the IP accomplishes an AR event in the WST after day 60, but on or before day 80, then his/her currency is extended to day 120. In no case will an IP/EP go more than 120 days in between aircraft AR events (90 days for MPs).
4. Crewmembers assigned to units north of the 60° parallel will manage night currency as follows: day events update night events from 1 Apr to 30 Sep. Unit commanders will determine crewmembers night currency status after 30 Sep.
5. Deleted.
6. Airdrop Proficiency Sortie (DPS) should include: Mission Planning, Air Refueling, Formation, Assault (NVG if able), Tactical Arrival and Departure, and an Airdrop. This sortie will be accomplished with an IP. The intent is to build proficiency in the aircraft. The IP will determine if enough training was accomplished to credit the event.
7. Simulator requires full operational motion and visual systems in order to credit the event.
8. Formation Sortie will include: SKE (or FFS when fielded) and VIS. Formation AR is desired.
9. See section **9.9** for additional guidance.
10. PNAF qualified crewmembers only.
11. Sortie includes primary aircrew logging a takeoff (P020) or landing (P190) outside the 48 conterminous United States and a review of oceanic crossing procedures and overseas airspace. A current aircraft commander or higher may re-gain currency for any other pilot.
12. Deleted.
13. FPQs may accomplish this event as pilot-flying under the direct supervision of an IP with no passengers on board. (On operational missions the required onload must be achieved before FPQs may attempt AR.) Units may be more restrictive.
14. Can be logged in WST only if flown as part of DMT/DMO (Distributed Mission Training/ Distributed Mission Operation).

Table 9.3S, Normal Simulator Events (creditable in aircraft)

Airland Events			
Code	**Event**	**All**	**Notes**
P100	Precision Approach	240	
P110	Non-Precision Approach	240	
P116	NDB Approach	240	
P118	RNAV Approach	240	
P130	Circling Approach	240	
RS06	Hi Alt Tactical Arrival	240	
RS16	Low Altitude Tactical Arrival	240	
RS20	Tactical Departure	240	
VT06	Threat Response	240	
AS21	Heavy Weight Full Flap, NT	240	
AS12	Landing LZ, NT	240	
NV80	NVG Instrument Approach	240	
P120	CAT II Approach	240	

Notes:

1. Applies to all: The intent of this table is to list the items that should normally be accomplished in the simulator during Phase. These items will now be specifically tracked and logged following the completion of each day of a phase sim. MARs are available at the simulator complex and a Boeing instructor will sign off all events accomplished to a proficient level. If an event listed here is not accomplished it may be accomplished during another simulator training session or in the aircraft, in these cases the accomplished items must be logged separately.

APPENDIX H: Chi-Square Test Results

Test Results for AMC Data			
Crew Qual	Formation	Instrument App	Receiver AR
IPB	$\chi 2$ (4, N = 44) = 9.45, $p < .05$	$\chi 2$ (5, N = 92) = 9.32, $p < .10$	$\chi 2$ (5, N = 63) = 5.78, $p < .33$
MPC	$\chi 2$ (4, N = 38) = 2.72, $p < .61$	$\chi 2$ (6, N = 149) = 5.27, $p < .51$	$\chi 2$ (5, N = 90) = 4.32, $p < .51$
FPQC	$\chi 2$ (4, N = 25) = 3.32, $p < .51$	$\chi 2$ (6, N = 105) = 9.96, $p < .13$	N/A
Crew Qual	Takeoff	Landing	Landing, Night
IPB	$\chi 2$ (5, N = 90) = 6.68, $p < .25$	$\chi 2$ (6, N = 96) = 4.97, $p < .55$	$\chi 2$ (4, N = 44) = 5.02, $p < .29$
MPC	$\chi 2$ (6, N = 163) = 28.22, $p < .01$	$\chi 2$ (6, N = 169) = 9.28, $p < .16$	$\chi 2$ (5, N = 63) = 8.67, $p < .12$
FPQC	$\chi 2$ (6, N = 108) = 19.00, $p < .01$	$\chi 2$ (5, N = 92) = 5.84, $p < .32$	$\chi 2$ (5, N = 60) = 8.04, $p < .15$

Test Results for AFRC Data			
Crew Qual	Formation	Instrument App	Receiver AR
IPB	$\chi 2$ (4, N = 33) = 4.54, $p < .34$	$\chi 2$ (6, N = 98) = 6.23, $p < .40$	$\chi 2$ (5, N = 72) = 6.86, $p < .23$
MP	$\chi 2$ (3, N = 22) = 2.40, $p < .49$	$\chi 2$ (5, N = 73) = 5.57, $p < .35$	$\chi 2$ (5, N = 51) = 9.57, $p < .09$
FPQC	$\chi 2$ (4, N = 32) = 3.99, $p < .41$	$\chi 2$ (6, N = 131) = 7.91, $p < .25$	N/A
Crew Qual	Takeoff	Landing	Landing, Night
IPB	$\chi 2$ (6, N = 100) = 4.62, $p < .59$	$\chi 2$ (6, N = 102) = 4.67, $p < .59$	$\chi 2$ (3, N = 32) = 2.06, $p < .56$
MP	$\chi 2$ (5, N = 83) = 7.41, $p < .19$	$\chi 2$ (5, N = 75) = 5.57, $p < .25$	$\chi 2$ (3, N = 26) = 5.92, $p < .12$
FPQC	$\chi 2$ (6, N = 140) = 6.86, $p < .33$	$\chi 2$ (4, N = 152) = 5.82, $p < .21$	$\chi 2$ (5, N = 48) = 5.65, $p < .35$

Test Results for AMC Data		Test Results for AFRC Data	
Crew Qual	Tanker AR	Crew Qual	Tanker AR
IPB	$\chi 2$ (5, N = 93) = 19.44, $p < .01$	IPB	$\chi 2$ (6, N = 87) = 11.48, $p < .07$
MPC	$\chi 2$ (6, N = 186) = 75.00, $p < .01$	MP	$\chi 2$ (5, N = 56) = 6.27, $p < .28$
FPQC	$\chi 2$ (6, N = 124) = 67.56, $p < .01$	FPQC	$\chi 2$ (6, N = 102) = 9.53, $p < .14$

APPENDIX I: Recommended KC-10 pilot FBCT Table

BAQ Events		Crew Position				
Code	**Event**	**IP**	**MP**	**FP**	**Notes**	**SIM**
G240	CRM WST	A	A	A	2	Y
G250	Refresher WST	Q	Q	Q	2	Y
M010	Proficiency Sortie	Q	Q	Q	1, 2, 3	M+R
P020	Takeoff	60	45	30	1, 2	M+R
P070	Instrument Approach	60	45	30	1, 2	M+R
P190	Landing	60	45	30	1, 2	M+R
P192	Night Landing	90	90	90	1, 2	M+R
P260	Have Quick	365	365	365	1	M+R
P270	Secure Radio Operation	365	365	365	1	M+R
R060	Tanker AAR	90	60	45	1, 2	M+R
R070	Tanker AAR, Breakaway	90	90	90	1, 2	M+R
R080	Tanker AAR, AP Off	180	180	90	1, 2	M+R
R090	Tanker AAR, Slow Speed	180	180	90	1, 2	M+R
Mission Events		Crew Position				
Code	**Event**	**IP**	**MP**	**FP**	**Notes**	**SIM**
F020	Formation Sortie	135	120	90	2, 8	M
F030	Large Formation	365	365	365	2	M
F060	AAR Formation	180	180	180	2	M
M020	Coronet Sortie	365	180	180	2, 4	N
M030	Overseas Sortie	365	365	365	2, 5	N
M040	Cargo Sortie	365	180	180	2, 6	N
M050	Tactical Sortie	365	365	365	2, 7	M+R
P280	ACDTQT	T	B	A	1	M+R
R010	Receiver AAR	60	45	[redacted]	2, 8, 9	M
R013	Receiver AAR, Aircraft	120	90	90	2, 8	N
R020	Receiver AAR, Night	180	120	120	2, 8, 9	M
R030	Receiver AAR, Heavyweight	365	365	365	2, 8, 9	M
R040	Receiver AAR, Breakaway	180	180	180	2, 8, 9	M+R
R050	Receiver AAR, Tanker AP off	180	180	180	2, 8, 9	N

M = Maintain

R = Regain

M+R = Maintain & Regain

N = Not Creditable in Simulator

Y = Simulator only

Notes:

1. May maintain & regain currency 100% in WST (fully creditable).
2. Loss of qualification if non-current in excess of 6 months.
3. To obtain credit for M010 individual must log one each of the following: P080; P090; P100; P110; P116 or P117; P130; P150; P160; and P200.
4. Coronet sortie should include: Mission Planning, Air Refueling, and Formation (if required). This sortie should be accomplished with an IP, if an IP is not available then the AC must complete a training report for any FP on the mission. The intent is to build proficiency in the mission. The AC will determine if enough training was accomplished to credit the event.
5. Overseas sortie includes primary aircrew logging a takeoff (P020) or landing (P190) outside the 48 conterminous United States and a review of oceanic crossing procedures and overseas airspace. A current aircraft commander or higher may re-gain currency for any other pilot.
6. Cargo sortie should include: Mission Planning, Air Refueling, and Formation (if required). This sortie should be accomplished with an IP, if an IP is not available then the AC must complete a training report for any FP on the mission. The intent is to build proficiency in the mission. The AC will determine if enough training was accomplished to credit the event.
7. Tactical sortie must include: Mission Planning; P061; P062; P063; P064; P065; P066; P067; P068; and P069. This sortie should be accomplished with an IP, if an IP is not available then the AC must complete a training report for any FP on the mission. The intent is to build proficiency in the mission.
8. Simulator requires full operational motion and visual systems in order to credit the event.
9. FPQs may accomplish this event as pilot-flying under the direct supervision of an IP with no passengers on board. (On operational missions the required onload must be achieved before FPQs may attempt AR.) Units may be more restrictive.

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14. ABSTRACT

The purpose of this Graduate Research Project is to determine if a Frequency-Based Continuation Training (FBCT) system is more effective, efficient, and flexible than the current flying continuation training system being used by the Mobility Air Forces. The researcher employs a Monte Carlo simulation to predict the volume of training events accomplished and effects of a currency period change on aircrew readiness. The accomplishment data used for the simulation was collected from current KC-10 pilots within Air Mobility Command and Air Force Reserve Command. The methodology employed concludes that FBCT more accurately expresses the mission-ready effectiveness of pilots than the current continuation training model. The research concludes there is no discernable difference in the efficiency of event volume completion between the two training systems. The research could not determine which system provides the greatest flexibility for achieving required mission accomplishment. The researcher recommends a small group study be accomplished to further evaluate the benefits and challenges of the two continuation training systems.

15. SUBJECT TERMS
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